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Association Between Fiscal Effort Above Required Local Effort and Accreditation in Virginia Schools

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ASSOCIATION BETWEEN FISCAL EFFORT ABOVE REQUIRED LOCAL EFFORT AND ACCREDITATION IN VIRGINIA SCHOOLS

by

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ABSTRACT

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This study expands on previous research regarding the adequacy of educational funding in order to reach a desired academic outcome. Specifically, this study examines Virginia policies of Standards of Quality and Standards of Accreditation to see if local fiscal effort above the minimum required by Virginia has an association to the desired minimum academic outcome of school accreditation.

The research in this study shows that when using a linear regression analysis or an ANCOVA there is no relationship between effort above Required Local Effort (RLE) and the percentage of students attending an accredited school. However, when looking at the non-linear data in this study, there does appear to be a relationship between effort above RLE and the percentage of students attending an accredited school. The t-tests run show a significant difference between the sustained or increased effort above RLE and decreased effort above RLE. Further, localities with sustained or increased effort above RLE had the largest average percentage of students attending accredited schools. The conclusion being that the practical significance of sustained and increasing effort above RLE has a positive relationship to a higher percentage of students attending accredited schools.

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CHAPTER I
Introduction

This study explores the association between local fiscal effort beyond what is required by the state and school accreditation in Virginia's poorest localities. Virginia's constitution calls for the state to provide for a quality public education and tasks the legislature with defining a quality education, the resources to produce a quality education, and a way to fund it. The results of Virginia's constitutional mandates are the Standards of Quality (SOQ), which define the state requirements for a quality education and the required minimum resources to achieve that mandated goal.

Virginia has also developed a system to require localities to pay their share of the costs for those required resources, called Composite Index – also known as the Required Local Effort (RLE). As accountability systems for measuring school quality became more prominent, Virginia's legislature required each local division to report how much beyond the RLE each was spending. Starting in 2010, the Virginia Department of Education (VDOE) has submitted the Required Local Effort report yearly to the state legislature. The report ranks localities by the percent of local expenditures above that required by the SOQ. This report is reminiscent of the 1851 list that Horace Mann compiled where he ranked the local educational expenditures of localities in Massachusetts. The township at the bottom of the list expressed "mortification" at being at the bottom (Kaestle, 1983, p. 122). Virginia's constitutional system to provide a quality education and the resources and funding system for that education is intended to prevent any locality from sharing that feeling of mortification when their efforts to fund education fall short. This study examines the association between local fiscal effort above what Virginia funding laws require and accreditation of Virginia public schools controlling for SES of the school divisions.

In this dissertation, Chapter I sets the conceptual framework for the study, the purpose and significance of the study, the research questions, the methodology, delimitations, and definitions of key terms used. Chapter II is a literature review of equity and adequacy in school funding. It includes the roles of the levels of government in school finance, fiscal capacity and effort, Virginia's systems to meet constitutional compliance of providing a quality public education, educational accountability, educational production function, change rate of fiscal effort, and a revisit of adequacy as a conceptual framework. Chapter III entails the study's methodology, including revisiting the research purpose and questions, the sample and range, variables, data collection and analysis, and limitations of the methods. Chapter IV has the study's results, including descriptive findings, assumptions, and analysis of the collected data. Chapter V is a discussion of the findings to include implications, recommendations for further research, and conclusions.

Conceptual Framework

The concept of fiscal adequacy provides this study's framework. An operational definition of fiscal adequacy is, "to teach the average student to state standards, and then to identify how much each district/school requires to teach students with special needs…to the same high rigorous achievement standards" (Odden & Picus, 2004, p. 25). Fiscal adequacy can further be defined as a sufficient level of funding to deliver the resources necessary to provide school divisions, schools, and student the reasonable opportunities to meet state accountability requirements. The fiscal definition of *adequacy* is a value driven concept. Owings and Kaplan state, "People define adequacy subjectively according to their own priorities and opinions. Attempts have been made to quantify how much a state or school district needs to spend for its students, but the actual figure remains ambiguous" (2013, p. 186). Adequacy is providing

enough for meeting a stated goal. Furthermore, if it is desirable to exceed the stated goal, and anything less than the goal is unacceptable, then the goal itself is also a measure of adequacy. Thus it is in education. There are standards, or priorities, to what constitutes an appropriate education. These include increased overall proficiency and growth in measured student achievement, high school graduation and completion, and other school quality metrics. These standards are measured through an accountability system which determines whether a school effective in helping all students meet the approved state standards. By examining the resources provided for education (inputs) and the results generated by an accountability system (outcomes), it can be determined if the resources are the minimum amount of funding needed to teach all students to meet state achievement standards.

Equity and excellence are essential factors in funding schools, but they are not sufficient. According to Owings and Kaplan (2013), equity is not always an appropriate lens to examine school finances, "Equity involves giving students what they need to be successful. Adequacy involves giving students enough of what they need to be successful" (2013, p. 69). From a legal standpoint equity is not a viable complaint in federal court cases (which will be visited in Chapter II). It can be at the state level depending on the state's constitutional language. Adequacy is a more appropriate lens for this study because the variables are Virginia's definition of required local fiscal effort and Virginia's definition of a school producing, or meeting, state accountability requirements. It is desirable for schools to achieve beyond the minimum goal of full accreditation standards. And it is desirable for localities to invest more than the minimum in fiscal effort as required by the SOQ. The baseline of the minimum fiscal requirements must be examined to see they are adequate to produce the expected outcome.

Purpose and Significance of the Study

This study explores the association between local fiscal effort and school quality in Virginia's poorest localities through the conceptual lens of fiscal adequacy. Earlier research has looked at the association of fiscal effort and student outcomes (Cedo, 2014; Ellison, 2015; Goodale, 2009; Johnson, 2014) and call to expand this field of study (Ellison, 2015, p. 138). The earlier studies focused on dependent variables that are single outcomes such as juvenile incarceration rates, graduation rates, and specific standardized test pass rates. This study expands on the current body of knowledge by using school accreditation status in Virginia as the dependent variable. School accreditation is unique in that it is a comprehensive measure of school quality rather than a singular outcome. By combining multiple student outcomes into the measure of accreditation, overall school quality, or acceptable academic quality, can be measured. Furthermore, school accreditation status is appropriate since it is the accountability measure of acceptable academic quality in Virginia. Also, in the lens of adequacy, fiscal effort is measured through the actual local expenditures for operations above RLE for funding the SOQ. In this study, this is referred to as fiscal effort above SOQ. The required local effort for SOQ is the minimum funding required for a school division by Virginia law and is thus operationalized as baseline for adequacy. The significance of this study is that it adds to the existing body of knowledge regarding fiscal effort and student outcomes in the unique manner of using a collective measure and focusing on the measures of both fiscal adequacy and acceptable academic quality in a specific state, Virginia. Further, the correlational design of this work determines if Virginia's funding laws for adequacy have an association in providing for what Virginia law deems sufficient in student outcomes: students attending schools that are fully accredited.

Research Questions

The purpose of this study is to examine whether Virginia's formula for adequate local fiscal effort meets Virginia's standard for sufficient school performance. This research determines the association of local fiscal effort and student outcomes as represented by full state accreditation. The following research questions are used:

RQ1: Controlling for SES, what is the association of eight years of high slope for fiscal effort on school accreditation rates?

RQ2: Controlling for SES, what is the association of eight years of flat slope for fiscal effort on school accreditation rates?

RQ3: Controlling for SES, what is the association of eight years of low slope for fiscal effort on school accreditation rates?

Methodology

The research for this study has a quantitative non-experimental ex post facto design. The study is quantitative and uses only pre-existing data from public reports from government agencies (Labaree, 2013). The study uses a bivariate correlational design to determine if there is an association between the fiscal effort above SOQ and school accreditation through the range of 2010-2018 (Creswell, 2003). Further, to examine the association between these two variables over time, the slope of the fiscal effort over 8 years is examined. The association between fiscal effort above SOQ and accreditation status at a particular time interval will be seen (see Figure 3, p. 54). The selection of the sample are those school divisions who have maintained their positions in the poorest quartile of localities in Virginia. Virginia determines a locality's required contribution to education by using a formula called Composite Index. Using factors of taxable retail sales, true value of property, and adjusted gross income, each locality is assigned a

Composite Index in the range of .1754 to .8000 (2018-2020 Composite Index of local ability-to-pay, 2018). The lower the Composite Index score, the smaller percentage is required of the locality. The localities in the sample have maintained a Composite Index rating below .3 for the entirety of the sample range. Therefore, the sample districts have maintained their low ability to pay according to the state formula. Also, in this study, by determining the slope, or rate of change for each school division for their fiscal effort above SOQ, the data shows if fiscal effort has been sustained, increased, or decreased. Additionally, this study controls for low SES to determine the effect on the slope of the association between fiscal effort above SOQ and accreditation status.

Delimitations

The correlational design of this study produces generalizable results. However, correlational studies do not produce causal links between the studied variables. This study does not consider the many other factors that could play into the student outcomes that contribute to school accreditation status. Various factors in the sample localities are unique to Virginia. Virginia is a diverse state with school divisions in urban, suburban, and rural areas. Fiscal capacity and effort do not account for all of the other differences in these areas. There is also a limited range in this study of only eight years, the result of reporting local effort above SOQ only since 2010. Finally, this study examines the school divisions' spending above RLE and does not consider how those funds may be allocated among the various schools in the system. Although the research shows that change from fiscal effort should be recognizable in five to seven years; the range of this study would only account for one cycle of an eight-year window (Bermand & McLaughlin, 1978; Fullan, 2000).

Definition of Key Terms

LCI – Local Composite Index- "Composite Index determines a school division's ability to pay education costs fundamental to the commonwealth's Standards of Quality (SOQ). The Composite Index is calculated using three indicators of a locality's ability-to-pay:

- True value of real property (weighted 50 percent)
- Adjusted gross income (weighted 40 percent)
- Taxable retail sales (weighted 10 percent)

The largest percentage of SOQ funding required for a locality is 80 percent. The lowest percent fluctuates. The LCI is also referred to as the Required Local Effort.

Fiscal Capacity – "a measure of wealth reflecting the locality's ability to fund education" (Owings & Kaplan, 2012, p. 126). Fiscal capacity for this study will be determined using the Virginia method of determining capacity: Local Composite Index.

Fiscal Effort – "The level to which the locality chooses to support education to the fullest capacity that it can afford" (Owings & Kaplan, 2012, p. 126). In previous studies building on the work of Owings and Kaplan, fiscal effort was a ratio of the revenue collected for education divided by the overall tax base. Fiscal effort is its own concept. For the purposes of this study, a division's effort above Required Local Effort (RLE) will be examined.

Percent of Actual Local Expenditures for Operations Above Composite Index for SOQ – This dataset "is collected from school divisions annually to show the degree to which each school

division has met, failed to meet, or surpassed its required local expenditure in support of the Standards of Quality" (Virginia Department of Education, 2017e).

NCLB – No Child Left Behind Act of 2001 – a federal law that mandated that states establish a yearly student testing system to demonstrate schools and students are making adequate yearly progress in math and reading.

ESSA – Every Student Succeeds Act of 2015—a federal law that replaced the No Child Left Behind Act of 2001. ESSA amended the federal mandates for accountability testing, giving the states more flexibility to establish their own accountability systems within the requirements of the federal accountability system.

Equity – There are two type of equity; horizontal and vertical. "Horizontal equity states that people who are alike should receive equal treatment…Vertical equity states that the treatment of unequals requires appropriate unequal treatment" (Owings & Kaplan, 2013, p. 69). For the purpose of this study, the definition of *equity* will be that of vertical equity since fiscal capacity is being considered.

Fiscal Adequacy – Fiscal adequacy is "a sufficient level of funding to deliver an adequate education to every student in the state" (Augenblick, Myers, & Anderson, 1997, p. 63). In Virginia, the Department of Education sees adequacy as the necessary amount "of resources necessary to provide school division, schools, and students with reasonable opportunities to meet state accountability requirements" (O'Quinn, 2017). Adequacy in education finance is more than

the minimum required. "This high minimum approach focuses on what would be needed to assure that all children have access to those educational opportunities that are necessary to gain a level of learning and skills that are now required, say, to obtain a good job in our increasingly technologically complex society and to participate effectively in our ever more complicated political process" (Minorini & Sugarman, 1999, p. 175).

Fully Accredited – the standard for Virginia schools meeting consistent level of acceptable educational quality.

> "Elementary and middle schools are Fully Accredited if students achieve all of the following pass rates:
>
> - English – 75 percent or higher
> - Mathematics – 70 percent or higher
> - Science – 70 percent or higher
> - History – 70 percent or higher

High Schools are Fully Accredited if:

- Students achieve pass rates of 75 percent or higher in English and 70 percent or higher in mathematics, science and history; and
- Attain a point value of 85 or greater based on the Graduation and Completion Index (GCI).

> Under legislation approved by the 2016 General Assembly, schools that earn full accreditation for three consecutive years are automatically rated as Fully Accredited for an additional three years" (Virginia State Board of Education, 2015).

The definition of Fully Accredited has varied slightly over the range of this study, but the concept of it being Virginia's measure of overall adequacy has remained.

Ex post facto – A casual comparison research method used to determine casual relationships between existing circumstances and observations in the past (Lord, 1973).

SOQ – Standards of Quality – "The Constitution of Virginia (Article VIII, § 2) requires the Board of Education to prescribe standards of quality for the public schools of Virginia, subject to revision only by the General Assembly. These standards, found in the *Code of Virginia* at §§ 22.1-253.13:1 through 22.1-253.13:10, are known as the Standards of Quality (SOQ) and encompass the requirements that must be met by all Virginia public schools and school divisions. Every two years, as required by the *Code*, the Board of Education reviews the SOQ for necessary revisions" (Virginia Board of Education, 2017c). The SOQ set forth the minimum required programs and resources.

SOL – Standards of Learning - describe Virginia's "expectations for student learning and achievement in grades K-12 in English, mathematics, science, history/social science, technology, the fine arts, foreign language, health and physical education, and driver education" (Virginia Department of Education, 2017b). A series of end of course tests are given to students and used to determine school accreditation status.

SOA – Standards of Accreditation – Virginia's standards of accountability for each school. The Virginia Board of Education defines the SOA as a way to establish standards "designed to ensure

that an effective educational program is established and maintained in Virginia's public schools. The accreditation standards:

- Provide an essential foundation of educational programs of high quality in all schools for all students.
- Encourage continuous appraisal and improvement of the school program for the purpose of raising student achievement.
- Foster public confidence.
- Assure recognition of Virginia's public schools by other institutions of learning.
- Establish a means of determining the effectiveness of schools" (Virginia State Board of Education, 2015).

Accreditation rating – "School accreditation ratings…are based on student achievement on Standards of Learning (SOL) tests and other tests in English, mathematics, history/social science and science administered during [the previous school year] or on overall achievement during the three most recent years. The results of tests administered in each subject area are combined to produce overall passing percentages in English, mathematics, history/social science and science. Accreditation ratings also reflect adjustments made for schools that successfully remediate students who initially fail reading or mathematics tests. Adjustments also may be made for students with limited English proficiency and for students who have recently transferred into a Virginia public school. All of these factors are considered in calculating pass rates in each subject area" (Virginia State Board of Education, 2015). High school Graduation Completion Index is another factor in determining a school's accreditation rating.

GCI – Graduation Completion Index – "The GCI calculation comprises students in the cohort of expected on-time graduates (students who were first-time ninth graders four years ago, plus transfers in and minus transfers out) and students carried over from previous cohorts. A student earning a diploma who entered ninth grade for the first time five years ago is an example of a carryover student. Carryover students are included in annual GCI calculations until they graduate or otherwise leave school. Students with disabilities and limited-English proficient students are included in the GCI calculation when they earn a diploma, GED, or certificate of completion; drop out or otherwise exit high school; or are no longer eligible for free public education services" (Virginia State Board of Education, 2015). Each student outcome is given a point value: board recognized diploma, 100; GED, 75; still in school, 70; certificate of program completion, 25; dropout, 0. "The weighted index points are totaled and then divided by the sum of cohort students and carryover students who dropped out or left school without earning a credential" (Virginia State Board of Education, 2015).

SES - Socio-Economic Status – SES is a measure of a person's combined economic and social status and can be measured in multiple ways. For the purposes of this study, low SES students will meet the same definition as an economically disadvantaged student in VDOE reports. The VDOE considers a student economically disadvantaged if the student is eligible for free or reduced meals, receives Temporary Assistance for Needy Families, is eligible for Medicaid, or is identified as homeless or migrant (Virginia Department of Education, 2009).

CHAPTER II

Literature Review

Problem Posing

In Virginia, fiscal equity is addressed through the Composite Index, educational quality is addressed through the SOQ, and curricular accountability is addressed through the Standards of Learning and Standards of Accreditation. These state policies each attempt to provide a minimum compliance guideline (a floor level of services) but allow for flexibility for a local school division to provide more for their students. The educational structure provided by policies in Virginia creates disparities between the local school divisions in equity because there is no ceiling. The policy floor only addresses fiscal adequacy. One could argue that the Composite Index, or Required Local Effort is designed to fund a floor level of services that is inadequate to meet these high expectations of educational quality. This study will determine, if the Virginia policy of adequacy in local fiscal effort has an association with and is sufficient to produce accountability results that lead to a school being fully accredited.

Equity and Adequacy in School Funding

In order to understand the connection between equity, adequacy, and accountability, literature regarding the relationship among the three concepts will be reviewed. Additionally, the policies regarding equity, adequacy, and accountability for the state of Virginia will be described.

In their 1997 article on school funding, Augenblick, Myers, and Anderson defined equity and adequacy in school funding and proposed how it should happen in policy making and how it actually happens. "Equity is measured in terms of the variation in per-pupil revenues among school districts in a single state...Adequacy is a sufficient level of funding to deliver an adequate

education to every student in the state" (p. 63). The term "adequate education" may be more clearly stated as an education of acceptable academic quality. Clune expounded on adequacy by referring to it as setting high minimum goals, or "adequate for some purpose, typically student achievement" (1994, p. 377). Equity and adequacy are elusive goals across states and within many states. Rebell (2007) provides an insightful analysis, "Ensuring all students adequate funding involves two major dimensions: determining how much money is needed and revising the state's education finance system to ensure that this amount is actually made available to all school districts" (p. 61-62). Rebell states that to determine what adequate funding is, the focus should be "on matching funding to student needs [which would be] a vast improvement over past practices under which funding allocations generally were determined through back room political deals unrelated to actual student need" (Rebell, 2007, p. 62).

Equity is treating people, schools, and programs appropriately according to their needs and situation. Further, there are two types of equity, horizontal and vertical. Horizontal equity involves treating equals appropriately equally. Vertical equity is "providing what people need—recognizing that students and schools differ and that the treatment of unequals requires appropriate unequal treatment" (Owings & Kaplan, 2012, p. 182). When considering fiscal equity, it is best to focus on states individually since the 10th Amendment to the U.S. Constitution makes education a state responsibility by default. "Historically, the federal government contributes, on average, about 10% of total education spending…from 1970 through 2016" (Snyder, de Brey, & Dillow, 2018, p. 81). "By accepting these federal funds, states and localities surrender some of their power to operate the schools in their state or locality as they want" (Owings & Kaplan, 2012, p. 58). Beyond this federal influence, states each have the

responsibility for education and states do not support education in the same manner. Consequently, states should be studied individually in regard to equity and adequacy.

The federal government uses policy to enact mandates tied to the funding provided to states and school divisions. NCLB provided new accountability practices which increased federal oversight. Clune predicted the creation of a policy similar to NCLB in 1994, "There is thus every possibility that educational adequacy will eventually be defined as every student scoring at least at the proficient level on new tests" (p. 378-379). By creating accountability policy through NCLB, the federal government was trying to provide curricular equity by demanding state standards and acceptable educational performance through testing. However, accountability policies of NCLB created more unfunded mandates. Lee and Wong addressed the impact of accountability policies that underscored the effects of unfunded mandates, "The function of accountability policies has been largely "regulatory" rather than "supportive," relying more on mandates and sanctions than on capacity building and rewards" (2004, p. 820). ESSA, passed in 2015, amended the NCLB federal mandates for accountability testing, giving states more flexibility to establish their own accountability systems within the requirements of the federal accountability system. However, federal accountability remains in place. Consequently, states have to balance their educational goals with those of ESSA and determine a way to adequately fund acceptable educational performance.

The policy difference between equity and adequacy is the policy's focus: output or input. Equity is looking at the level of input to have an outcome that is fair to every student. Adequacy policies focus on the output and require backwards planning, starting with the goal of what the expected performance standard should be and then identify what is required to meet it. Equity policies focus on the input and ensuring that all divisions or schools get the appropriate treatment

and have appropriate expectations and resources. For example, "courts have, in fact, specifically ordered such "cost studies" in Wyoming, Ohio, New York and a number of other states, and these precedents have been the catalysts for a plethora of other cost studies" (Rebell, 2007, p. 620). Virginia passed legislation to address the educational goals that the state and the federal government require and has specified additional policies to regulate how those goals are to be funded. These policies are the Standards of Learning, the Standards of Accreditation, Standards of Quality, and the Composite Index. Each of these policies attempts to address different facets of curricular and fiscal equity and adequacy. The Standards of Learning address curriculum, the Standards of Accreditation define acceptable educational performance for schools, the Standards of Quality specify the minimum required resources for each school division, and the Composite Index determines the required local fiscal effort. The other indicators to consider when discussing equity in Virginia are fiscal effort above the Required Local Effort and per pupil expenditure. These can determine how much a division spends beyond what policy dictates as adequate.

Two landmark cases in challenging state educational finance systems are *Serrano v. Priest* (1971) and *San Antonio Independent School District v. Rodriguez* (1973). In *Serrano*, the California Supreme Court "determined that education was a fundamental interest" (*Serrano v. Priest*, 1971). "In *San Antonio Independent School District v. Rodriguez* (1973), the U.S. Supreme Court ruled that education could not be considered a fundamental right…because education was not among the rights guaranteed by the federal Constitution. For all intents and purposes, litigation for school finance reform under the federal Equal Protection clause umbrella ended with *Rodriquez*" (Owings & Kaplan, 2012, p. 63). Further, in the *Rodriquez* decision, the U.S. Supreme Court ended the notion that public education was a constitutionally protected right

and instead was the responsibility of the states and not a federal matter. While this seems to go against the case of Brown v. the Board of Education, the Court clarified that this discrimination was not appropriate, but that such school funding schemes that claim "wealth discrimination" do not provide enough "basis for invoking strict scrutiny" (Vacca & Bosher, 2012, p. 113). Consequently, states can determine their own systems but cannot be discriminatory. Since that response, the legal focus at the federal level has been on adequacy or at the state level if education funding meets state constitutional language. "Adequacy as a fiscal concept is value driven; it is in the eye of the beholder. That is, people define adequacy subjectively according to their own priorities and opinions" (Owings & Kaplan, 2012, p. 186). Adequacy "in the school finance world [is used] to describe the amount of funding schools need to educate children to high standards" (Malhoit, 2005, p. 3).

There are other court cases also addressing fiscal adequacy or a topic related to in providing school resources. Rebell (2005) addresses some of the prominent cases in his paper, *Adequacy Litigations: A New Path to Equity?* which focuses on the "recent state court decisions that have invalidated state funding systems denying adequate education to poor" (2005, p. 2).

There are cases that question state funding and state constitutional language. In 1989 the Kentucky Supreme Court ordered per pupil funding to be balanced across the state (Rose v. Council for Better Education, Inc.). In New Jersey the case of *Abbott v. Burke* (1990) was originally brought up in 1981 but has been revisited by New Jersey courts repeatedly. Each court decision for Abbott v. Burke (1990) has resulted in New Jersey adjusting their educational funding system to make funding more equitable among school divisions (Howard, 2006). Rebel's work focuses on the recent state litigation regarding scrutiny of state funding systems in regard to adequacy and equity. The literature and court cases show a drift away from fiscal

equity and a move toward fiscal adequacy in the 1990s as a result of failed litigation and other political forces (Clune, 1994). "The shift from equity to adequacy" has been reflected in judges' tendency to "uphold claims of denials of basic levels of adequate education" (Rebell, 2005). This study will provide further scrutiny of Virginia's funding system in regard to adequacy.

Despite the change in litigation strategy and court rulings, equity policies were not abandoned in the 1990s. Equity policies continued with curriculum changes. Policies created a common curriculum. However, the way the common curriculum policies (NCLB and Standards of Learning) were enforced through test-based accountability shifted the focus on the outputs instead of the input; "there is a growing public perception that state education accountability policy has replaced "inputs" with "outcomes" across the United States in the last 2 decades" (Lee, 2006, p. 45). The outputs of standardized test results would continue to show a lack of equity.

Virginia's Standards of Learning and Standards of Accreditation policies were part of the national movement of curriculum changes with accountability. The Standards of Learning and Accreditation set high minimum expectations with the Composite Index and SOQ providing a funding and staffing formula to meet those expectations. When looking at the inputs and results from Virginia's Region 2 in 2016, it is clear that not all schools and school divisions receive the same fiscal resources. However, there is evidence that schools and divisions can meet accountability standards with the comparably low resources if the policies for adequacy are followed. Poquoson City Schools is an example of this (see Table 1 and Table 2). 100 percent of Poquoson schools are accredited while providing the next to lowest per-pupil expenditure in the region. However, the data also show that increased funding is not the only factor – demographics matter. Franklin City Schools and Northampton County Schools comparatively

spend much more than their Region 2 counterparts, with far less success (see Table 1 and Table 2). The demographics of these school divisions are different. It is important to note that Northampton and Franklin have needier populations and may need even more funding and the flexibility to spend the funding according to their particular areas of need. Consequently, there is a need to control for socio-economic status when considering school performance and funding.

Table 1. Region 2 equity, accountability, and accreditation policy measures

County/City	Composite Index	# of Division Staff	Local Fiscal Effort Rank in VA (GSP)	Per Pupil Expenditure	% of Fully Accredited Schools	# of Schools Fully Accredited
Accomack	.3555	13	75	$10,042	73	8
Chesapeake	.3610	78	1	$10,692	76	34
Franklin City	.2978	5	76	$12,925	33	1
Hampton	.2878	72	88	$10,426	41	12
Isle of Wight	.4195	30	55	$9,667	89	8
Newport News	.2908	115	66	$10,563	39	15
Norfolk	.3123	53	27	$10,671	38	17
Northampton	.4840	10	100	$12,431	25	1
Poquoson	.3895	16	30	$9,511	100	4
Portsmouth	.2678	68	105	$10,206	58	11
Southampton	.2878	18	48	$10,045	83	5
Suffolk	.3490	40	85	$9,437	58	11
Virginia Beach	.4034	154	41	$10,825	89	73
Williamsburg/ James City	0.8/.5632	45	12	$10,974	100	15
York	.4026	49	69	$9,896	100	19

Source: Johnson, 2014, Virginia Department of Education, 2016b, *VDOE:* Virginia School Division Staff – by Region, Virginia Department of Education, 2016a, VDOE: Composite Index of Local Ability to Pay., Virginia Department of Education, 2018a, *VDOE*: School Accreditation Ratings.

When looking at just Region 2 of Virginia, the diversity in Composite Index ratings, per pupil expenditures, and percentage of schools accredited vary. The variations of the Composite Index ratings are a result of the value of the real property, the adjusted gross income, and taxable retail sales. That shows the economic diversity in just one region of the state according to Composite Index. Those areas that have increased individual poverty may need more per funding per student to meet accreditation standards. Additionally, even with increased per pupil expenditures, some divisions are still not meeting the expected mark of accreditation. This may be from the additional factor of students in poverty. Additionally, this chart shows the amount of personnel support beyond the school setting that each of these divisions have. Larger school divisions have more division level support personnel. Fiscal capacity, poverty, population, and personnel support can all be indicators leading to school accreditation. All of these factors are worthy of further research. The Standards of Quality in combination with the Composite Index set a Required Local Effort (RLE) for educational spending and required positions to fill based on population. This study explores the relationship between fiscal effort beyond RLE and accreditation in the poorest school divisions in the state. Consequently, fiscal capacity and poverty are addressed as mitigating factors.

Table 2. Region 2 equity, accountability, and accreditation policy measure rankings

County/City	Composite Index	# of Division Staff	Local Fiscal Effort Rank in VA (GSP)	Per Pupil Expenditure	% of Fully Accredited Schools
Accomack	8	13	10	11	8
Chesapeake	7	3	1	5	7
Franklin City	11	15	11	1	14
Hampton	14	4	13	8	11
Isle of Wight	3	10	7	13	4
Newport News	12	2	8	7	12
Norfolk	10	6	3	6	13
Northampton	2	14	14	2	15
Poquoson	6	12	4	14	1
Portsmouth	15	5	15	9	9
Southampton	13	11	6	10	6
Suffolk	9	9	12	15	9
Virginia Beach	4	1	5	4	5
Williamsburg/ James City	1	8	2	3	1
York	5	7	9	12	1

Source: Johnson, 2014, Virginia Department of Education, 2016b, *VDOE:* Virginia School Division Staff – by Region, Virginia Department of Education, 2016a, VDOE: Composite Index of Local Ability to Pay., Virginia Department of Education, 2018a, *VDOE*: School Accreditation Ratings.

The literature expands on this theme that not all schools should be treated equally, but all schools should get what they need. Clune referenced this as "equity plus" (1994, p. 379). Schools with needs beyond what is deemed average should receive "compensating aid and services" for the additional needs unique to their school and community (Clune, 1994, p. 380). This approach is a reference to the need for more localized control of finances focused on the needs of individual schools and the resources they could utilize. Orthner, Jones-Sanpei, Akos, and Rose (2013, p. 32) stated "schools were designated as Equity Plus schools…based on the percent of students using free or reduced-price lunch and other need measures. Equity Plus

schools were provided additional resources for smaller classes and additional student services". The concept of "equity plus" is that what is considered equity by state funding is not enough to meet the needs at the school level. Localities are left to provide the needed funding beyond what the state provides. In Virginia, the SOQ provide the minimum requirements for how state funding must be allocated. After SOQ funding, localities must determine how to fund needed programs above required SOQ funding—if they can afford to do so.

Roles of Federal, State, and Local Governments in School Finance

In the 18th century, economist Adam Smith called for public education as a stimulus for nations' economic growth (Smith, 1979). In the 19th century, Horace Mann saw public education as means for social mobility. Mann stated, "Education then, beyond all other devices of human origin, is the great equalizer of the conditions of men, the balance-wheel of the social machinery" (Gelbrich, 1999). Whether the purpose is to create a better workforce or an attempt to increase social mobility, the U.S. Constitution did not claim authority or responsibility for education. The Tenth Amendment states, "the powers not delegated to the United States by the Constitution…are reserved to the States respectively" (*Constitution of the United States: A Transcription*, 2015). Consequently, the majority of power and responsibility for public education rests with the states. The federal government does maintain some power of oversight regarding education when states and localities accept federal funds through the Fourteenth Amendment which gives the federal government oversight by providing "any person within its jurisdiction the equal protection of the laws" (Pelsue, 2017). The federal government has exercised the equal protection clause by creating mandates and accountability systems for education. Since the federal government has determined that states have responsibility over education; states and localities also bear the financial responsibility. On average, only about

10% percent of education funding in each state is provided by the federal government (Snyder, de Brey, & Dillow, 2018, p. 81). In Virginia specifically, in fiscal year 2013 the sources of revenue for public schools were federal government 7.4 percent, state 39.2 percent, and localities 53.4 percent (Snyder, de Brey, & Dillow, 2018).

In the 19th century, it became common practice for states to have a clause regarding public education in their constitutions (Odden & Picus, 2004). Article VIII, Section 1 of the Virginia Constitution states, "The General Assembly shall provide for a system of free public elementary and secondary schools for all children of school age throughout the Commonwealth, and shall seek to ensure that an educational program of high quality is established and continually maintained." (Commonwealth of Virginia, 2016b). Further in Article VII, Section 2, the groundwork for who will determine what "an educational program of high quality" is and who will pay for it is established:

> "Standards of quality for the several school divisions shall be determined and prescribed from time to time by the Board of Education, subject to revision only by the General Assembly. The General Assembly shall determine the manner in which funds are to be provided for the cost of maintaining an educational program meeting the prescribed standards of quality, and shall provide for the apportionment of the cost of such program between the Commonwealth and the local units of government comprising such school divisions. Each unit of local government shall provide its portion of such cost by local taxes or from other available funds."

The Code of Virginia has expanded on the division of financial responsibility by establishing the Composite Index (CI). The Composite Index is a formula used to determine a locality's ability to pay for education. This is used in conjunction with the Standards of Quality

(SOQ) to legislate how state and local funding must be allocated. The minimum funding is based on the SOQ which dictate how many of each position a division must employ based on student enrollment. Each of these components is expanded later in this chapter.

The Virginia school funding formula attempts to address the fiscal capacity gaps, fiscal equalization, and competing localities. In their book, *Public School Finance* (1995), Salmon and Alexander noted that historically, "it is apparent that a considerable difference exists among the districts in their ability to finance educational programs" (p. 166-167). Virginia tries to address these resource gaps through the fiscal equalization Composite Index Formula. However, the payment of state funding is based on student enrollment, which serves as an advantage to larger school divisions, since necessary costs of doing business are spread over a larger population. Additionally, localities are not capped in how much the can spend. Consequently, some divisions are spending close to the minimum required while others are spending much more. Not all localities have the fiscal capacity to fund above the required minimum SOQ.

Fiscal Capacity

Fiscal capacity is a nation's, state's or locality's ability to support public services financially (Owings & Kaplan, 2013). Fiscal capacity is not merely determined by a state or locality's' tax base, but by its potential taxing power and ability to impose those taxes; giving more context to the data point (Adams, 1983). However, fiscal capacity is only one side of the coin. A state or locality's ability, or capacity to fund a service does not equate to it happening. States and localities have numerous services they must support.

Fiscal Effort

Fiscal effort is the level at which a state or locality does support a service in relation to its fiscal capacity. It is appropriate, then, to consider fiscal capacity and fiscal effort together. For

the purposes of this study, fiscal capacity and fiscal effort refer to educational funding. Local fiscal effort is defined by "the proportion of its wealth invested in K-12 public education" (Johnson, 2014). The area of fiscal effort was studied by Goldschmidt and Eyermann (1999) and expanded by Owings and Kaplan (2012). Goldschmidt and Eyermann based fiscal effort on Gross State Product (GSP). Owings and Kaplan built on this by developing a longitudinal database and used the Gross State Product in the following formula:

$$E=R/TB$$

In this formula "E" is fiscal effort, "R" is the revenue expended based on per pupil enrollment, and "TB" is the Gross State Product per capita. For this study, the fiscal capacity of the locality is determined by the state Composite Index and the fiscal effort is determined by the localities' percent of actual local expenditures for operations above required local effort for SOQ. Each of those terms, why they are appropriate measures for fiscal capacity and fiscal effort in this study, and each's limitations will be explained.

Composite Index

In Virginia, the General Assembly (the state legislature) has operationalized their state constitutional mandate to "provide for the apportionment of the cost of [public education] between the Commonwealth and the local units of government" by determining that on average across the state (Commonwealth of Virginia, 2016a). However, not all local governments pay the same percentage. The percentages each locality is responsible for is based on Virginia's formula for determining fiscal capacity, the Composite Index. Virginia's "Composite Index determines a school division's ability to pay education costs fundamental to the commonwealth's Standards of Quality (SOQ). The Composite Index is calculated using three indicators of a locality's ability-to-pay:

- True value of real property (weighted 50 percent)
- Adjusted gross income (weighted 40 percent)
- Taxable retail sales (weighted 10 percent)

The Composite Index was developed as a political compromise in an attempt to equitably divide the state contribution to public education. As an equation, the Composite Index formula is pictured in Figure 1. Average Daily Membership (ADM) is the number of students enrolled in public schools. This formula determines each localities percent of SOQ funding for which it is responsible and is calculated on a two-year cycle. For example, the lowest Composite Index for the 2018-2020 cycle was .1754 for Lee County; which means Lee County was responsible for paying for 17.54 percent of required SOQ expenditures and the state paid the other 82.46 percent. The highest index for the same cycle was .8000 for eight localities. This means that for those nine localities, they were responsible for paying for 80 percent of required SOQ expenditures and the state paid the other 20 percent. This funding split is based on student enrollment, average daily membership, or the ADM Component. Owings and Kaplan explained the limitations of this approach,

> "In Virginia, for example, small, rural Highland County has approximately 250 students. Fairfax County, one of the largest school districts in the country, located outside the nation's capital, has approximately 163,000 students…In general, larger school divisions reach a point of efficiency. The cost of all services is spread out over a larger student base, reducing per-pupil costs. For example, a school with 400 students and another with 600 students may have the same number of administrators, secretaries, librarians, and nurses, but the larger school may have four or five more teachers. If the cost of operating the school on a per-student basis is spread out over all of the students, it is more cost

effective to run the school with 600 students than the one with 400 students. Larger districts have the ability to organize schools more efficiently than do smaller school districts" (2012, p. 136).

Figure 1 – The Calculation of the Composite Index

$$\text{ADM Component} = .5\left[\frac{\frac{\text{Local True Value of Property}}{\text{Local ADM}}}{\frac{\text{State True Value of Property}}{\text{State ADM}}}\right] + .4\left[\frac{\frac{\text{Local Adjusted Gross Income}}{\text{Local ADM}}}{\frac{\text{State Adjusted Gross Income}}{\text{State ADM}}}\right] + .1\left[\frac{\frac{\text{Local Taxable Retail Sales}}{\text{Local ADM}}}{\frac{\text{State Taxable Retail Sales}}{\text{State ADM}}}\right]$$

$$\text{Population Component} = .5\left[\frac{\frac{\text{Local True Value of Property}}{\text{Local Population}}}{\frac{\text{State True Value of Property}}{\text{State Population}}}\right] + .4\left[\frac{\frac{\text{Local Adjusted Gross Income}}{\text{Local Population}}}{\frac{\text{State Adjusted Gross Income}}{\text{State Population}}}\right] + .1\left[\frac{\frac{\text{Local Taxable Retail Sales}}{\text{Local Population}}}{\frac{\text{State Taxable Retail Sales}}{\text{State Population}}}\right]$$

Local Composite Index =

((.6667 x ADM Component) + (.3333 x Population Component)) x 0.45 (average local share)

Figure 1. Virginia's Calculation of the Local Composite Index

Source: Virginia Department of Education, 2017f.

To show the variety of ways states approach their public education responsibility, the Hawaii state government does not put any fiscal responsibility on localities for required public school funding (Hawaii State Department of Education, 2017). Hawaii is a unique outlier; treating the state as one school division. North Carolina provides on average 65 percent of funding for its 115 school divisions (Nordstrom, 2017, p. 10). "North Carolina's school finance system is described as a "resource allocation model" where funding is provided to districts via several allotments…allotments can be categorized based on the manner in which they provide

resources to districts. Dollar allotments provide districts a fixed pot of funds from which to spend funds. In contrast, position allotments provide districts with a given number of positions, with the state taking responsibility for paying the appropriate salary for the given position" (Nordstrom, 2017, p.13). Localities in North Carolina are left to provide what they feel necessary beyond the state allotment. Wealthier school divisions are able to provide more than their poorer counterparts. In 2015-2016, Chapel Hill/Carrborro City Schools provided $5,710 in per pupil local funding, while Swain County provided only $415 in per pupil local funding (Nordstrom, 2017, p. 16). Similar to Virginia, North Carolina school divisions have disparities in local fiscal effort beyond what is required and provided by the state.

Standards of Quality

The next step in funding public education in Virginia is determining what is required to maintain the constitutional mandate "to ensure that an educational program of high quality is established and continually maintained" (Commonwealth of Virginia, 2016b). Virginia's SOQ "encompass the requirements that must be met by all Virginia public schools and school divisions" (Virginia Department of Education, 2018a). The SOQ are a detailed list of requirements in seven overarching standards:

1. Instructional programs supporting the standards of learning and other educational objectives.
2. Instructional, administrative, and support personnel.
3. Accreditation, other standards, assessment, and releases from state regulations.
4. Student achievement and graduation requirements.
5. Quality classroom instruction and educational leadership.
6. Planning and public involvement.

7. School board policies.

Each standard contains compliance requirements of each local school board. There these are the required programs and resources that must be funded in the Composite Index dictated share of funding. There is no limit on how much a locality can spend above that required by SOQ. To ensure compliance, starting in 2010, localities were required to report the percent of the fiscal year actual local expenditures for operations above required local effort for SOQ. This report shows compliance, but also reveals the stark inequities in local fiscal effort above that which is required.

One example of how divisions can vary in resources is in the area of personnel. The SOQ have 13 categories outlining specific faculty-to-student ratios of different school-based personnel. The ratios laid out in the SOQ are division-wide requirements. Consequently, each school division maintains the prerogative to have varying ratios of school-based staff at different schools at the elementary, middle, and high school levels throughout the division. This gives school divisions with more schools more flexibility to adjust ratios. Conversely, schools with only three or four schools have fewer options for investing in the required resources and are restricted by state SOQ policy as to their ability to share a staff member between the elementary, middle, and high schools. The SOQ also allows division discretion as to how much division level support staff must be provided to support the work done at the schools. The Code of Virginia states, "Each local school board shall provide those support services that are necessary for the efficient and cost-effective operation and maintenance of its public schools" (Commonwealth of Virginia, 2016a). What each division deems necessary, efficient, and cost-effective within the stated guidelines may vary. School divisions may also shift the grade levels serviced in each of their schools in order to classify the schools in the elementary, middle, or

high school category that best fits their division needs. These are just two examples of many ways a locality can adapt how the SOQ are applied to them. However, each locality has the same seven standards to work within.

Education Accountability

In Virginia, the SOQ outline what constitutes the minimum educational program and compliance measures by law. These accountability measures are a result of political changes as highlighted by *A Nation at Risk* report (National Commission on Excellence in Education, 1983) and the bipartisan legislation referred to as Every Student Succeeds Act (Every Student Succeeds Act U.S. Department of Education, 2018).

Nationally, in 1965, President Johnson signed the landmark legislation of the Elementary and Secondary Education Act (ESEA). ESEA was a piece of civil rights legislation that focused on equity as a civil rights law. ESEA provided federal grants for school divisions with low-income students, special education, and state agencies targeting the improvement of elementary and secondary schools. ESEA was the largest infusion of federal funds for public education to date, including the Title I program of Federal aid to disadvantaged children to address the problems of poor urban and rural areas (U.S. Department of Education, 2017). ESEA was federal education law focused on equity. The next step was adequacy.

At the start of the Reagan administration, The National Commission on Excellence in Education was charged with comparing the U.S. education system with those in other countries and making conclusions on how the American system could be improved. In 1983, the commission published *A Nation at Risk: The Imperative for Educational Reform* (National Commission on Excellence in Education, 1983). The report was a political, not a scholarly, publication, with subsections such as, “America Can Do It” (Gardner, 1983, p. 128). The report

persuasively cited statistics that ordinary citizens could understand. The patriotic nature of the writing was well-timed for the Cold War-charged political environment. The report ended with recommendations for five general topics: content, standards and expectations, time, teaching, and leadership and fiscal support. It is not a coincidence that these recommendations line up well with the seven standards in the SOQ. The report noted that our educational system was not providing adequate training for a competitive workforce. *A Nation at Risk* shifted the focus from equity to adequacy. The next step was accountability.

No Child Left Behind (2001) and Every Student Succeeds Act (2015) – Reauthorizations of ESEA

In 2001, the ESEA was reauthorized, revamped, and renamed with bipartisan support. Led by Senator Ted Kennedy and President George W. Bush, the ESEA became the No Child Left Behind Act (NCLB). NCLB was passed with a focus on accountability for states and localities. It built on prior equity legislation by disaggregating reporting for student outcomes into demographic subgroups, to account for the achievement of all students on math and reading tests. The end goal was that "all children have a fair, equal, and significant opportunity to obtain a high-quality education and reach, at a minimum, proficiency on challenging State academic achievement standards and state academic assessments" ("Title I - Improving the academic achievement of the disadvantaged," 2004). The accountability required states to have plans leading to all students being successful on state assessments by 2014. Schools and divisions that were making progress toward the 100 percent goal were acknowledge for making Adequate Yearly Progress (AYP). AYP goals for each year leading up to 2014 were left up to the states.

Virginia was a national leader in academic accountability policy. After failed reforms and a drop in NAEP test scores, Governor George Allen and state superintendent of public instruction, William Bosher, Jr. created the Commission on Champion Schools to revise the

Standards of Learning. In 1998, Virginia started assessing student learning with the accountability SOL tests. This laid the groundwork for Virginia's compliance with NCLB.

On December 10, 2015, President Obama signed the Every Student Succeeds Act (ESSA) into law. ESSA focused on making progress in accountability measures with focuses on groups of students, or subgroups, who were underperforming. Additionally, ESSA required that students "be taught to high academic standards that will prepare them to succeed in college and careers" (U.S. Department of Education, 2018). Each state was required to make accountability plans to comply with ESSA requirements.

Accreditation as a Valid Measure of School Quality and Adequacy

Virginia's Standards of Learning (SOLs) are the state's common curriculum standards determined by the Virginia Department of Education and used by all public schools in Virginia. Virginia is not a Common Core Curriculum state. In 2009, 41 states developed and adopted the Common Core State Standards as "the knowledge and skills students should gain throughout their K-12 education" (Common Core State Standards Initiative, 2018). Virginia never adopted these standards. Virginia had already gone to considerable expense when in creating its own standards and maintained the use of the SOLs. The SOL curriculum was instituted in preparation for and response to NCLB legislation for states to develop common curriculum standards. Virginia developed the SOLs in order to have uniformity in curriculum in preparation for accreditation tests, also mandated by NCLB and updated SOQ. The accountability measures to ensure the appropriate delivery of the SOLs are laid out in the Virginia Standards of Accreditation (SOA). The SOA "are designed to ensure that an effective educational program is established and maintained in Virginia's public schools" (Virginia State Board of Education, 2015, p. 3). As a result of how schools perform on these accreditation measures, schools are

assigned one of the following statuses: 1) Fully Accredited, 2) Partially Accredited, 3) Accreditation Denied, or 4) Conditionally accredited (for new schools only) (Virginia Department of Education, 2018b). Schools that fail to consistently meet Fully Accredited status receive sanctions dictated by the VDOE.

Educational Production Function

A production function study is one way to measure the effectiveness of any type of investment. This type of study examines the cost of inputs relative to some output. For example, a business may want to determine if increasing lighting on the factory floor will increase worker productivity sufficiently to make the lighting investment worthwhile. In business models, profits can be measured. In a service industry like education with so many input variables, it is more difficult to isolate and measure the effectiveness of a singular variable. Applying a production function measure to education is further complicated by determining or defining the dependent variable of student achievement. There are two sides of the Educational Production Function argument. Hanushek advocated for years that increased fiscal input does not correlate with increased student achievement (Hanushek, 1979). Hanushek has stated recently that inputs that have fiscal ties such as "class size is a relevant variable only in settings with low teacher quality. Among other school inputs, descriptive evidence suggests that measures of the quality of inputs and, in particular, teachers are more closely related to student outcomes" (Hanushek & Woessmann, 2017). Hanushek seems to qualify his previous position and does acknowledge the connection between school funding inputs and student achievement, when the funds are specifically targeted to certain instructional or curricular needs (Hanushek & Woessmann, 2017).

The other side of the educational production function argument comes from Greenwald, Hedges, and Laine (1996). While these are not the only proponents of increased fiscal

investment having a relationship to increased student achievement, they participated in a lively exchange on the topic with Hanushek in 1994, published in *Educational Researcher* (Greenwald, Hedges, & Laine, 1994; Hanushek, 1994). Greenwald, Hedges, and Laine have published results from meta-analysis of studies with aggregated data and longitudinal studies that "a broad range of resources were positively related to student outcomes, with effect sizes large enough to suggest that moderate increases in spending may be associated with significant increases in spending that may be associated with significant increases in achievement" (1996, p.361). The work of this meta-analysis focused on the things that money can buy. This fits the education production function narrative in that, like business, money spent can be measured. The outcomes in this study were based on National Assessment of Educational Progress (NAEP) trend data. Greenwald, Hedges, and Laine also concluded that inputs that describe the quality of teachers such as teacher ability, teacher education, and teacher experience also "show very strong relations with student achievement" (1996, p. 384). Both camps of Hanushek and Greenwald, Hedges, and Laine cite the work of similar sources including each other and criticize the methods of the others. In 2016, Hedges revisited the topic and concluded, "The diversity of methods has resulted in a body of literature too diverse and too inconsistent to yield reliable inferences through meta-analysis" (Hedges, Pigott, Polanin, Ryan, Tocci, & Williams, 2016, p. 143). Further he suggested that, "addressing the question from a variety of disciplinary and practice perspectives may lead to more effective interventions to meet the needs of all students" (Hedges, Pigott, Polanin, Ryan, Tocci, & Williams, 2016, p. 143). These differing opinions of research methods and what sources and studies should and should not be used, indicate that within the field of education production function that there are many biases and limitations that may make it inappropriate for educational research or conclusions.

Conceptual Framework: Fiscal Adequacy

The conceptual framework for this study is fiscal adequacy. More specifically, what is a sufficient level of funding to deliver a level of acceptable educational quality (Augenblick, et. al., 1997, p. 63). The term *adequacy* in regard to the education provided to students became a term of accountability during the life of the No Child Left Behind policy. Schools were held accountable for making Adequate Yearly Progress (AYP) when reporting results on standardized tests and graduation rates. NCLB has been retired and federal accountability is now under ESSA. Consequently, the accountability measure of AYP is no longer used. However, despite the policies and methods changing, the federal government has continued with accountability measures for delivering a level of acceptable educational quality. Virginia has linked federal accountability measures to their accreditation process. It can be implied that the desired minimum level of acceptable educational quality in Virginia is when a school is fully accredited. Although schools can provide students with education beyond what is required, the Virginia Standards of Accreditation are the baseline for expectations in regard to what acceptable educational quality is. ESSA "maintains an expectation that there will be accountability" and although it provides grants, states and localities must provide funding to meet the ESSA requirement to "ensure success for students and schools" (U.S. Department of Education, 2018). Previous to ESSA and in response to NCLB, six states legislated studies to determine if their state educational funding was sufficient and distributed appropriately to provide an adequate education (Taylor, Baker, & Vedlitz, 2005, p. 3).

There are four general methods states use in determining funding adequacy. Odden (2003) gave a brief overview. The methods are the successful district approach, the cost function approach, the professional judgement approach, and the evidence-based approach. The

successful district approach identifies what the state deems a successful district and then averages the per pupil expenditures of those districts, controlling for outliers. The weakness of this method is that it is usually found as inadequate in urban and rural districts. The cost function approach "employs regression analysis with expenditure per pupil as the dependent variable and student and district characteristics, as the independent variables. The result produces an adequate expenditure per pupil for the average district" (Odden, 2003, p. 122). Due to the fluctuation in what is considered an acceptable or sufficient performance level, this becomes difficult politically. These first two methods speak the language of those attempting to employ the education production function, because of the input (spending level)-output (performance level) simplicity of the methods. However, the simplicity of the education production function does not fit education because of the myriad of inputs. The professional judgement approach has educational experts identify the educational resources they believe are required for an education with an acceptable level of academic quality and then equate it to a per pupil amount. The weakness of the professional judgement approach is how much professional judgement can vary and its applicability across all districts in a state. The evidence-based approach is promoted by Odden because he helped to develop it. Although Odden does not note any weaknesses, one weakness would be the difficulty of identifying which comprehensive school design should be used in each situation.

Through the implementation of NCLB and ESSA, Virginia has maintained its state constitutional system of the SOQ which include the distribution of funds system of Local Composite Index and definitions of required resources that provide for "an educational program of high quality" (Commonwealth of Virginia, 2016b). The missing link in evaluating the adequacy of Virginia's school funding system is determining what level of funding beyond what

the SOQs require is used by academically successful districts that are fully accredited. This study investigates whether the formula Virginia has maintained for funding is adequate for its measure of accreditation.

Change Rate of Sustained Effort

Changing fiscal effort, like many other investments, takes time to work and to see a potential change in the results. Fullan (2000) examined large-scale reform and concluded that it is often unsuccessful if localities are not involved in the decision making of what reform to adopt and how to implement the chosen reform. Further, reforms are more successful if the differences of each locality are taken into consideration. Additionally, "it is important to remind ourselves that the goal is not only to establish large-scale reform, but to sustain it" (Fullan, 2000, p. 20). Reform efforts often fail to sustain fiscal effort. Programs that lack sustainability have the common factor of funding falling short after three to five years (Berman & McLaughlin, 1978, Fullan, 2000). Sustaining change and fiscal effort is important because in schools it can take two to six years to see the impact of reform and up to eight years on the district level (Fullan, 2000, p. 20). Consequently, this study uses data from a eight-year range to evaluate the association between the slope of local fiscal effort and achievement.

Summary

The accountability systems that require minimal standards for resources and achievement set a baseline for what is expected. Accountability can raise the expectations for fiscal adequacy and consequently narrow the equity gap. This is a floor not a ceiling; expecting adequacy does not produce equity. With the onset of NCLB, states were given a framework to determine what adequacy was in the form of achievement and funding systems. While some states waited to be instructed to create more robust systems of accountability, Virginia embraced it, even in its

constitution. The Virginia Constitution established the SOQ which created the foundation for educational quality in accountability and funding. The SOQ spell out the minimum resources required for each school division. The Local Composite Index, which is named in the Standards of Quality, determines a locality's fiscal capacity and minimum effort. Therefore, the SOQ outline Virginia's definition of adequate local fiscal effort. Additionally, the SOQ name the Standards of Accreditation, a combined measure of indicators, to determine an acceptable level of academic performance in student achievement at the school level. Starting in 2010, the Virginia legislature required a report of what percentage above the required local fiscal effort each school division received. However, there has not been a study to determine if the minimum fiscal effort leads required by Virginia is associated with schools meeting the minimum student achievement standards for full accreditation. The literature review indicates that after controlling for low SES, there may be a positive association between a high slope for fiscal effort over eight years and the percent of students in a division who attend a fully accredited school. In short, the literature indicates that Virginia's definition of adequate funding may not be sufficient for producing schools that meet standards for full accreditation.

CHAPTER III

Methodology

Introduction

This study explores the association between the educational fiscal effort of Virginia's poorest localities and school accreditation status of the schools in those divisions. The work of this paper adds to earlier research regarding educational fiscal effort in Virginia in relation to student outcomes (Cedo, 2014; Ellison, 2015; Goodale, 2009; Johnson, 2014). Ellison called for "an increased look at where educational spending makes an impact on student achievement" (2015, p. 138). The earlier studies focused on dependent variables that are singular outcomes such as juvenile incarceration rates, graduation rates, and specific standardized test pass rates. This study expands the current body of knowledge by using school accreditation status in Virginia as the dependent variable. School accreditation is its own phenomenon since it is a comprehensive measure of achievement instead of a single measure. There is no perfect comprehensive measure of school quality.

Accreditation is not the best measure, but it is a collection of multiple measures of student achievement (state standardized test scores in reading, writing, math, science, and social studies, graduation rates, and attendance) that when combined gives an approximate measure of school quality. Additionally, since this study is done through the conceptual lens of educational adequacy; accreditation status is appropriate since this is how Virginia defines a school as demonstrating sufficient academic performance to meet state accreditation standards. Also, in the lens of fiscal adequacy, fiscal effort will be measured through the actual local expenditures for operations above required local effort for SOQ. This is referred to as fiscal effort above SOQ. The required local effort for SOQ is the minimum funding required for a school division

by Virginia law and is thus operationalized as baseline for adequacy. This study adds to the body of knowledge to determine if Virginia's funding laws for adequacy are adequate in providing for what Virginia law deems sufficient in school achievement, full accreditation.

Research Purpose and Questions

The purpose of this study is to examine whether Virginia's formula for adequate local fiscal effort meets Virginia's standard for sufficient or acceptable school performance. This research builds on the existing body of knowledge to determine the association of fiscal effort and student outcomes. The following research questions are used:

RQ1: Controlling for SES, what is the association of eight years of high slope for fiscal effort on accreditation rates?

RQ2: Controlling for SES, what is the association of eight years of flat slope for fiscal effort on accreditation rates?

RQ3: Controlling for SES, what is the association of eight years of low slope for fiscal effort on accreditation rates?

Research Design

The research for this study has a quantitative non-experimental ex post facto design. The study is quantitative in that any conclusions are drawn from pre-existing statistical data from objective measures using data from public reports from government agencies (Labree, 2013). None of the statistical data were assigned by the experiment; it was all pre-existing or naturally occurring. Local expenditures above RLE is the independent variable in the study and is pre-existing statistical data. The localities that fund school divisions within Virginia are naturally occurring. Consequently, it is non-experimental. The study uses a bivariate correlational design to explore a potential relationship between the fiscal effort above SOQ and accreditation through

the years range of 2010-2018 (Creswell, 2003; Ellison, 2015). There is a concern about the time lag for results to change in relation to a change in sustained fiscal effort. The change rate for sustained fiscal effort is five to seven years (Berman & McLaughlin, 1978; Fullan, 2000). The selection of the sample was those school divisions which have maintained their Composite Index rating below .3 (the poorest quartile) for four two-year cycles, encompassing the range of the study. Therefore, the sample districts have maintained their ability to pay according to the state formula. Also, in this study, by determining the slope, or rate of change for each school division for their fiscal effort above SOQ, the data shows if fiscal effort has been sustained. In order to address the time lag of effects, the dependent variable and the accreditation status of schools is compared to the independent variable, fiscal effort above SOQ using the slope for fiscal effort over eight years. Consequently, if there is a relationship between fiscal effort above SOQ and accreditation status at a particular time interval, it can be seen.

Sample and Range

Due to the ex post facto design of this study, the samples used have all occurred in the past. The samples of data in this study range from 2010-2018. The data collected is from the 33 public school divisions in Virginia that have maintained a Composite Index score of less than .30 for the range of the study. This sample makes up the poorest quartile of the 132 school divisions in Virginia according to their ability to pay as calculated by Composite Index. As stated in Chapter I, the Composite Index considers the “true value of real property (weighted 50 percent), adjusted gross income (weighted 40 percent), and taxable retail sales (weighted 10 percent)” of a locality (Virginia Department of Education, 2017f). The geographic range is limited to the state of Virginia.

Variables

The independent variable of fiscal effort above SOQ is the reported Percent of Fiscal Year Actual Local Expenditures for Operations Above Required Local Effort for the SOQ as reported yearly by the Virginia Department of Education to the state legislature. The dependent variable is school accreditation ratings as reported yearly by the Virginia Department of Education. The independent and dependent variables are measured within the same range of 2010-2018. Since the 33 school divisions in the sample vary in size and number of schools and there is not an accreditation status for school divisions in Virginia, the percentage of total students in each school division who attend a fully accredited school are used as the dependent variable.

Data Collection

The measure of school accreditation was gathered from the Virginia Department of Education reports from the 2010-2018 range. The accreditation measure that is considered in this study is Fully Accredited. The other designations are Partially Accredited (of which there are seven various sub-categories), Accreditation Denied, and Conditionally Accredited. The status of Conditionally Accredited only applies to new schools that have not yet established a performance record to warrant one of the other categories. There are 11 schools within the range of 2010-2018 that started in the Conditionally Accredited status and then were recognized with other accreditation statuses within the sample range. These schools will be given the same treatment as Fully Accredited schools in the data set until the years they received one of the other accreditation statuses. The differences between Partially Accredited and Accreditation Denied is not explored. It suffices this study to state that a school has not met all of the requirements to be

Fully Accredited, which is the Virginia baseline for acceptable academic quality. The Virginia accreditation data was recorded from the Virginia Department of Education website.

It is important to note the difference in how local fiscal effort is defined in many of the previously mentioned studies and how it is defined for this study (Cedo, 2014; Ellison, 2015; Goodale, 2009; Johnson, 2014). The fiscal effort followed in these previous studies was similar to the one developed by Owings and Kaplan (2012), in their text, *American Public School Finance*. Owings and Kaplan calculated a locality's fiscal effort by dividing the school division's per pupil expenditure by the locality's total wealth: $E = R/TB$. In this formula E stands for fiscal effort, R stands for revenue for school expenditures or per pupil spending, and TB stands for the state wealth as defined by GSP (Gross State Product) on a per capita basis. In these previous works, this formula was used on both the state and local level. The data collection for this study regarding local fiscal effort was collected from the Required Local Effort and Required Local Match reports for fiscal years 2010-2018. This range starts in 2010 because of when Virginia law changed. In 2010, Section 22.1-97, *Code of Virginia* was changed to require localities to report "the degree to which each school division has met, failed to meet, or surpassed its required local expenditure in support of the Standards of Accreditation (SOQ)" (Virginia Department of Education, 2017e). This yearly report gives multiple figures, but for the purposes of this research, only the Percent of Actual Local Expenditures for Operations Above RLE is used since it is the only required expenditure for a locality by the state, thus establishing the floor for what the state requires or considers to be adequate. This builds on previous research in that similar factors go into the localities ability to pay, and that SOQ for a school division is determined by pupil enrolment, similar to the per pupil expenditure used by Johnson (2014).

Also, similar to the work of Johnson (2014), these expenditures focus solely on operational expenditures, which do not include capital outlay or debt service.

The data for school accreditation and local fiscal effort is imported into Statistical Package for the Social Sciences (SPSS). SPSS is statistical software that is used to organize the data to be more easily analysed and presented.

All of the data used for the study is available in the public domain. The Virginia Department of Education reports the majority of the data annually. The VDOE online database contains school accreditation status and enrolment summaries for all public schools as well as required local effort reports. The data can be sorted by school division and/or school. The schools are also sorted by their accreditation status each year. Using the accreditation and enrollment data, the percentage of total students in a school division who attend a fully accredited school was determined. This compensates for the differences in population and numbers of schools within districts.

Data Analysis

First, the Composite Index for all 132 localities was collected and the lowest quartile was determined. The lowest quartile are those school divisions that remain in below a Composite Index of .30 for all three two-year cycles from 2010-2018. Next, the local fiscal effort above SOQ was determined for all school divisions in the sample for each year from 2010-2018. The divisions were ranked by fiscal effort above SOQ for each year. The dependent variable was determined by finding the percentage of students in each school division that attend a fully accredited school each year from 2010-2018. The controlling factor of SES was also collected for each school division by year. The enrollment, SES, and accreditation data were gathered by using the yearly VDOE Fall Membership Data and accreditation reports for the schools and

divisions in the sample. Next, the independent variable of local fiscal effort above SOQ was analysed in relation to the dependent variable of the percentage of students attending fully accredited schools in each division. The data analysis answers the following research questions:

RQ1: Controlling for SES, what is the association of eight years of high slope for fiscal effort on accreditation rates?

RQ2: Controlling for SES, what is the association of eight years of flat slope for fiscal effort on accreditation rates?

RQ3: Controlling for SES, what is the association of 8 years of low slope for fiscal effort on accreditation rates?

The research questions were answered by first determining the eight-year slope of fiscal effort for the 33 school divisions. Then the school divisions were assigned to three groups: high slope, flat slope, and low slope. Next, using an analysis of covariance (ANCOVA) was used to examine the association of the independent variable of fiscal effort to the dependent variable of percentage of students who attend accredited schools, controlling for SES as the covariate. The percentage of low SES students in each of the divisions was used as the covariate. The results of this test then suggest whether the homogeneity of regression assumption was violated and if increased, flat, and low slope of fiscal effort have an effect on accreditation after controlling for SES. The coefficients for both variables were interpreted to have high positive (+1.00) to a moderate negative relationship (-1.00) or no relationship (0).

The research questions were answered by testing the following null hypothesises:

- Ho1: There is no statistically significant relationship between the increased eight-year of slope for fiscal effort above SOQ and the localities' percentage of students attending a fully accredited school.

- Ho2: There is no statistically significant relationship between the flat eight- year of slope for fiscal effort above SOQ and the localities' percentage of students attending a fully accredited school.
- Ho3: There is no statistically significant relationship between the decreased eight-year of slope for fiscal effort above SOQ and the localities' percentage of students attending a fully accredited school.

Limitations

Since this is an ex post facto study, it is a study of purely historical data and should not be overly generalized to events in the future. Also, although this study uses all data points for local effort above SOQ (since the inception of its reporting), the sample and range are not all-inclusive and therefore cannot validate all generalizations of these variables. Moreover, this study examines the school divisions' spending above RLE and does not consider how those funds may be allocated among the various schools in the system. Finally, the VDOE has recently proposed changes in graduation and accreditation requirements for Virginia high schools starting with the ninth-grade cohort of 2018-2019 ("VDOE: Graduation (Diploma) Seals of Achievement," 2016c). Consequently, going forward, the study may become less applicable, even within student outcome measures in Virginia, as the definition of accreditation changes.

Summary

The methods laid out provide a process to answer the overall question, "Is there an association between the local fiscal effort above SOQ for Virginia's poorest localities and state accreditation." The study extends the work of Johnson (2014), *Relationship Between Virginia's Fiscal Effort and Public School Graduation Rates* in that it examines the relationship of local fiscal effort and student outcomes in Virginia. The methodology replicates the ex post facto

nature of Johnson's work while controlling for the same covariates of socio-economic status. Like the previous study, this work does not need to test a hypothesis because it is a non-experimental ex post facto study. This study expands the works of Cedo, Ellison, and Johnson by using the more inclusive measure of student outcomes of school accreditation status rather than the individual outcomes of graduation rates and incarceration rates.

Although no hypothesis is necessary, the literature review suggests:

1. Fiscal effort and accreditation status will be positively correlated.
2. Division fiscal effort will display no significant amount of variance regarding accreditation status.

The literature reviewed suggests that fiscal effort and accreditation can be linked. However, the questions of adequacy and equity add another layer to the discussion. There is a point where any effort over a certain fiscal investment will not affect accreditation. The major factor affecting this is the covariate of SES, which is controlled for in this study.

CHAPTER 4

RESULTS

The purpose of this study is to explore the association between local fiscal effort beyond the minimum required by Virginia and student outcomes as represented by school accreditation in Virginia's poorest localities, controlling for poverty. Virginia first required localities to report actual local expenditures for operations above Required Local Effort (RLE) to the General Assembly in 2010. Schools are assigned accreditation ratings yearly based on a multifaceted measure of student academic achievement. Data for effort above RLE, school VDOE accreditation status, and free and reduced-price lunch populations were collected from the eight years since the inception of the RLE report in the 2010-2011 school year through the 2017-2018 school year.

Chapter Overview

This chapter will entail the findings of this study. First, a descriptive analysis of the variables is detailed. The localities in the study are identified as those that were assigned a Local Composite Index of less than .30 from 2010-2018. The independent variable of the percentage above actual local expenditures for operations above RLE, the dependent variable of the percentage of students in the corresponding school divisions attending fully accredited schools, and the co-variate of the percentage of enrolled students that qualify for free and reduced price lunch are identified for each locality in the study from 2010-2018. The data were analyzed to determine slopes for the independent and dependent variables from 2010-2018. Patterns in the data were analyzed and the divisions are categorized by the slopes of their fiscal effort above RLE, percentage of students attending fully accredited schools, and percentage of students qualifying for free and reduced-price lunch. T-tests were done comparing the slope groups of the

independent and dependent variables. Descriptive statistics were also analyzed for each slope group. Further analysis was done within slope groups based on the average effort above RLE. This was done to determine, despite a locality's slope of effort above RLE, if there was a practical effort above RLE that would result in acceptable academic output. A multiple regression analysis was run to determine the association between local fiscal effort above RLE and Virginia school accreditation over time. An analysis of covariance (ANCOVA) was used to control for poverty and to determine an association between effort above RLE and accreditation.

Descriptive Analysis of Variables

The descriptive analysis of variables was done for all of the localities and corresponding school divisions that were assigned a Local Composite Index of less than .30 from 2010-2018 (see Table 3). For each locality the minimum, maximum, mean, and standard deviation were calculated for the percentage above RLE, the percentage of students attending a fully accredited school, and percentage of economically disadvantaged students (see Appendix A). For all localities the data showed high standard deviation for percentage above RLE and percentage of students attending a fully accredited school. The high standard deviation denotes a wide range of values for these variables. The wide changes in the variables in just an eight-year range makes it more difficult to draw reliable conclusions. The data of the percentage of economically disadvantaged students had a low standard deviation designating a narrow range of values and relative consistency in the data. The summary data of the descriptive statistics for the 33-division sample are in Table 4.

Table 3. *Local Composite Index for localities with LCI less than .30, 2010-2018*

County/City	Composite Index 2010-2012	Composite Index 2012-2014	Composite Index 2014-2016	Composite Index 2016-2018
Alleghany	0.2151	0.2297	0.2423	0.2423
Brunswick	0.2728	0.2808	0.2837	0.2985
Buena Vista	0.1756	0.1773	0.1895	0.1932
Campbell	0.249	0.2655	0.2746	0.276
Carroll	0.2573	0.2696	0.2722	0.2831
Charlotte	0.2288	0.2365	0.2505	0.2539
Covington	0.2597	0.2775	0.2803	0.2818
Cumberland	0.2781	0.2805	0.2817	0.2971
Danville	0.2147	0.2629	0.2649	0.2653
Dickenson	0.194	0.2547	0.27	0.2711
Dinwiddie	0.2631	0.2777	0.285	0.2882
Emporia	0.2163	0.2495	0.2594	0.2602
Galax	0.2609	0.2695	0.2725	0.2738
Giles	0.2649	0.2706	0.274	0.2867
Greensville	0.1998	0.2174	0.2236	0.2259
Hampton	0.269	0.2773	0.2878	0.2912
Henry	0.2315	0.2331	0.2408	0.243
Hopewell	0.2108	0.2285	0.2298	0.2376
Lee	0.1692	0.1701	0.1826	0.1886
Lunenburg	0.2308	0.2434	0.2502	0.2535
Martinsville	0.2111	0.2175	0.2222	0.2263
Newport News	0.2778	0.2821	0.2908	0.2934
Nottoway	0.2366	0.2447	0.2478	0.2547
Patrick	0.2439	0.2479	0.2726	0.2866
Petersburg	0.2255	0.2365	0.2475	0.2516
Pittsylvania	0.2401	0.241	0.2475	0.2507
Portsmouth	0.2497	0.2506	0.2678	0.2755
Prince George	0.2344	0.243	0.2454	0.2513
Russell	0.2113	0.2375	0.243	0.2486
Scott	0.1821	0.1831	0.1888	0.194
Smyth	0.21	0.2136	0.2178	0.2252
Tazewell	0.2487	0.2695	0.2745	0.2756
West Point	0.2422	0.2581	0.2667	0.2838
Wise	0.1885	0.2045	0.2538	0.2669

Source: Virginia Department of Education. (2017f).

Table 4. *Descriptive statistics for the 33-division sample*

	N	Minimum	Maximum	Mean	Standard deviation
Percent of low SES students	272	26	100	61.13	14.287
Percent in accredited schools	272	0	100	73.31	31.263
Percent above RLE	272	0	296	68.58	56.982
Valid N (listwise)	272				

The assumptions of multiple regression analysis were tested. The data set was examined and verified to have a continuous scale. There are two exceptions in the Lee County data where the data were not reported for percentage above RLE in the 2011-2012 and 2015-2016 school years. For these data points in this study, Lee County was credited with zero percent above RLE. This is a noted limitation in the study. The data set contained three variables: percentage above RLE as the independent variable, percentage of students in fully accredited schools as the dependent variable, and percentage of economically disadvantaged students as the covariate. SPSS software was used to test the other assumptions of multiple regression analysis:

1. Create scatterplots to determine if linear relationship and if outliers exists.
2. Examine residuals for the data set to determine if there were significant outliers and for normal distribution.

These steps verified that all of the assumptions were met and that multiple regression analysis was appropriate for this study. The steps in this study are similar to those followed by Cedo when examining the relationship between state fiscal effort and high school graduation rates (2014, p. 70-71). The assumptions related to repeated measures of ANCOVA were reviewed. ANCOVA was used to control for individual poverty. Specifically, the percentage of

economically disadvantaged students in each division was used as the covariate. Economically disadvantaged is defined as a student who qualified for free or reduced-price lunch.

Fiscal Effort Above Required Local Effort, 2010-2018

The slope of the fiscal effort above RLE had to be determined for each of the 33 localities in the study over the range of the study, 2010-2018. A repeated measures analysis was conducted using SPSS software. A preliminary analysis was conducted to test the assumptions related to repeated measures. Also, diagnostics were run to determine if the data fit the model of regression. First, a block entry was conducted to examine the slope of fiscal effort above RLE for all localities in the sample individually and collectively. When local fiscal effort above RLE was observed using the linear model, the slope for the time observed was -1.4. Therefore, the fiscal effort above RLE over the 2010-2018 period for the sample group showed an overall decrease.

A quadratic model and a cubic model were used to examine the data further. Also, an *R* squared change test was done. The *R* squared test revealed that the cubic model was the best fit for the examination of the independent variable. The analysis showed there was a sharp increase in effort above RLE from 2011 to 2012 and then a steady decline in effort from 2012 to 2015. There was an increase in effort again in 2016, but not to the level of 2012, followed by a drop back to 2015 levels in 2017, with a slight increase in 2018. Figure 2 is the scatterplot and fit line for the trend in effort above RLE for the sample localities from 2010-2018 (Cedo, 2014, p. 72-74). The trend is more clearly displayed in the line graph in Figure 3 for the independent variable, dependent variable, and co-variable.

Figure 2. Scatterplot and fit line for the trend in effort above RLE for the sample localities from 2010-2018

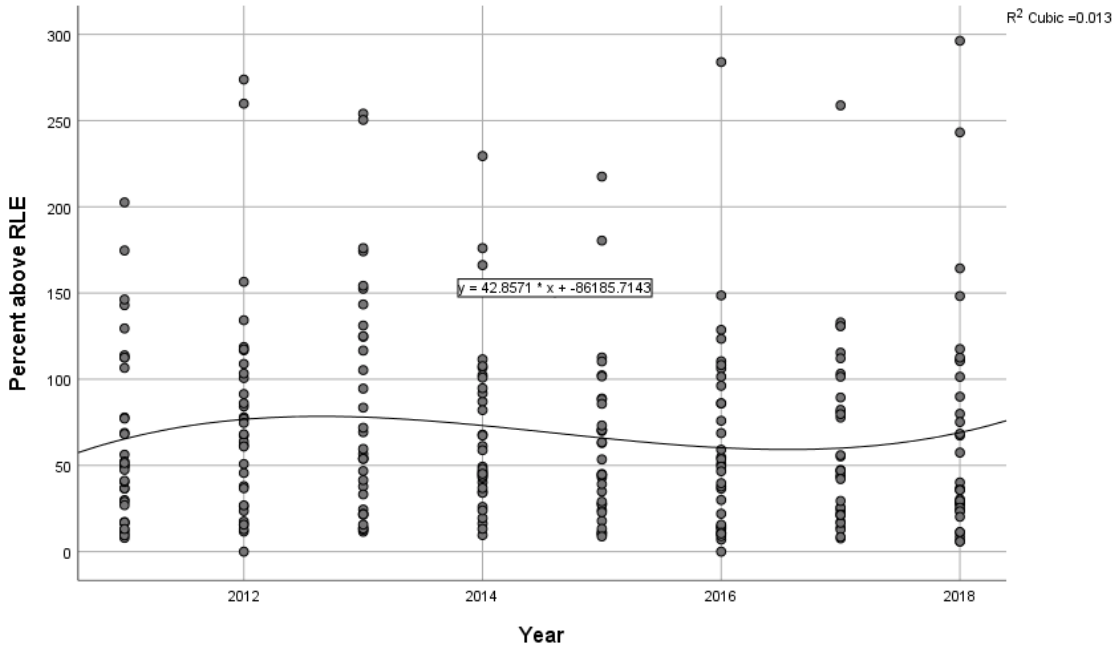
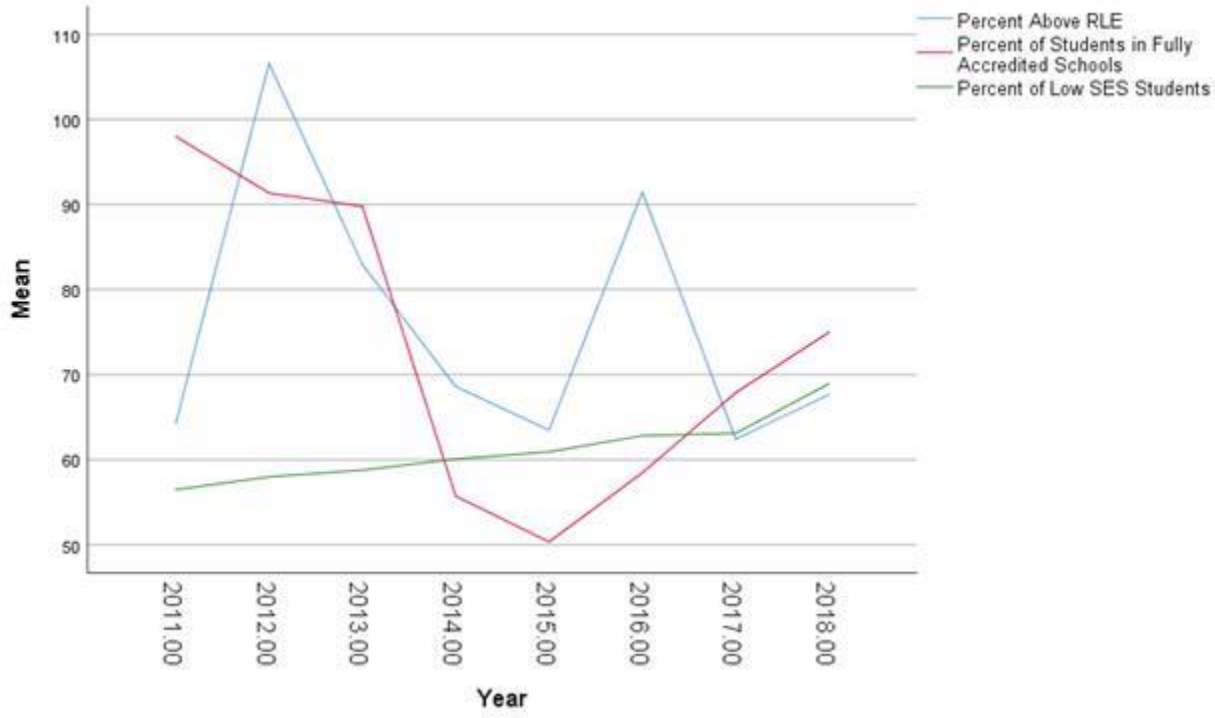


Figure 3. Line graph for the trend in percent above RLE, percent of students in fully accredited schools, and percent of low SES students for the sample localities from 2010-2018



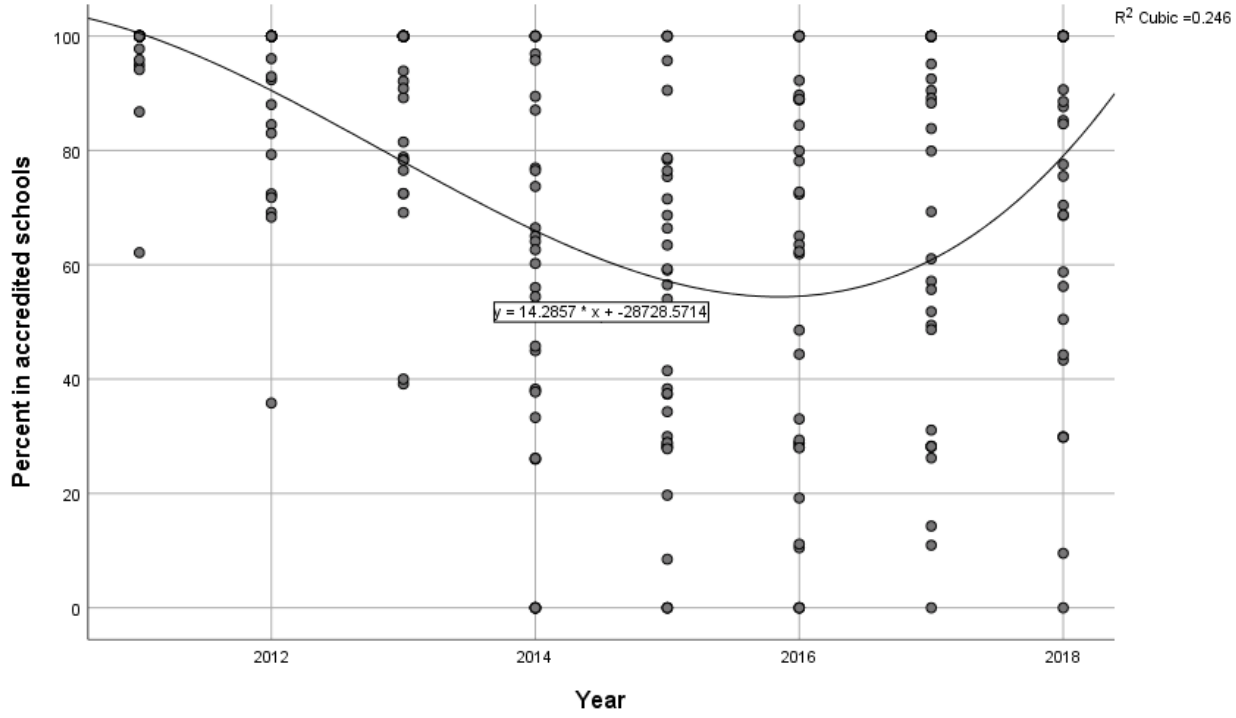
Percentage of Students Attending a Fully Accredited School, 2010-2018

The slope of the students attending a fully accredited school was determined for each of the 33 localities in the study over the range of the study, 2010-2018. A repeated measures analysis was conducted using SPSS software. A preliminary analysis was conducted to test the assumptions related to repeated measures. Also, diagnostics were run to determine if the data fit the model of regression. First, a block entry was conducted to examine the slope of students attending a fully accredited school for all localities in the sample individually and collectively. When students attending a fully accredited school was observed using the linear model the slope for the time observed was -4.4. The negative slope showed a decrease that was greater than the independent variable of effort above RLE. The slope of the percent of students in an accredited

school was more consistent, without the spikes in 2012 and 2016 that percent above RLE displayed (see Figure 3).

A quadratic model and a cubic model were used to examine the data further. Also, an *R* squared change test was done. The *R* squared test revealed that the cubic model was the best fit for the examination of the independent variable. The analysis showed there was a slight decrease each year from 2011 to 2013 with a sharp decrease from 2013 to 2014. There was a further drop in 2015. From 2015-2018 there has been an increase each year of students attending a fully accredited school. The increase in the years from 2015 to 2018 only recovered roughly half of the decrease that happened from 2011 to 2015, resulting in the overall slope of -4.4. Figure 4 shows the scatterplot and fit line for the trend in students attending a fully accredited school from 2010-2018 (Cedo, 2014, p. 72-74).

Figure 4. Scatterplot and fit line for the trend in students attending a fully accredited school from 2010-2018



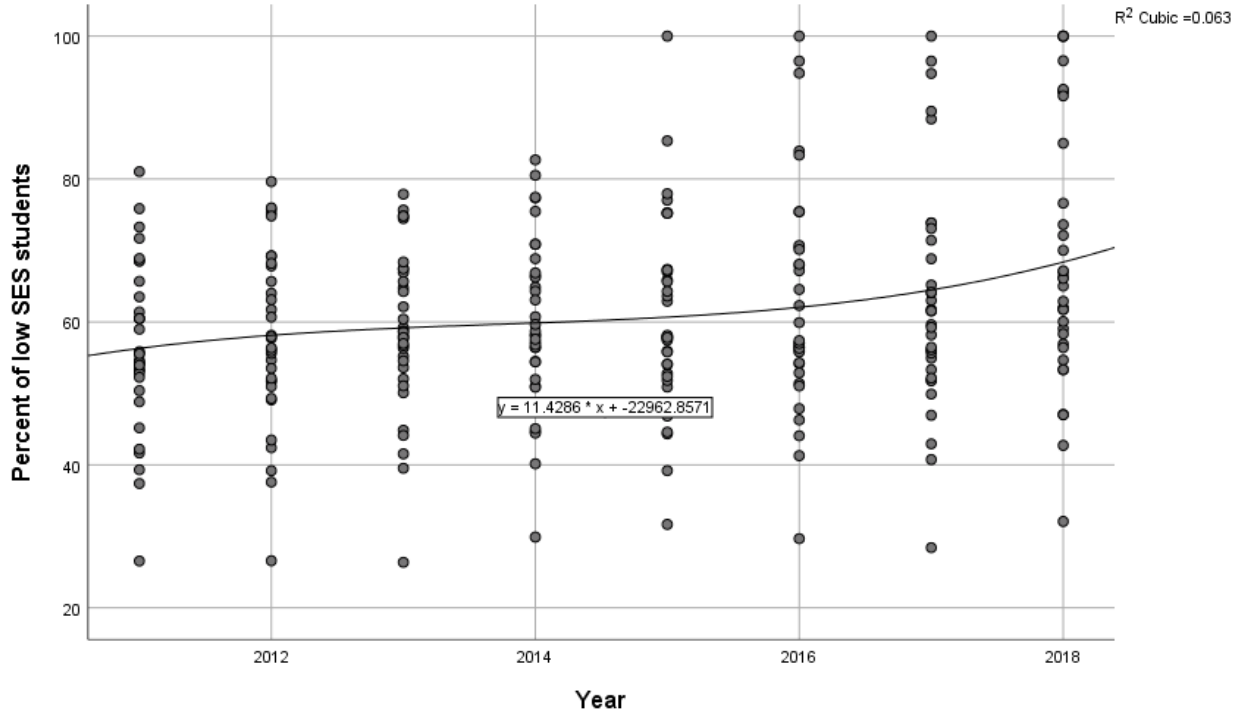
Percentage of Students Qualifying for Free or Reduced-Price Lunch, 2010-2018

The slope of the students qualifying for free or reduced-price lunch was determined as the covariate for each of the 33 localities in the study over the range of the study, 2010-2018. A repeated measures analysis was conducted using SPSS software. A preliminary analysis was conducted to test the assumptions related to repeated measures. Also, diagnostics were run to determine if the data fit the model of regression. First, a block entry was conducted to examine the slope of students qualifying for free or reduced-price lunch for all localities in the sample individually and collectively. When students qualifying for free or reduced-price lunch was observed using the linear model the slope for the time observed was 1.4. Therefore, the

increases in students qualifying for free or reduced-price lunch over the 2010-2018 period were slightly positive in slope.

A quadratic model and a cubic model were used to examine the data further. Also, an *R* squared change test was done. The *R* squared test revealed that the cubic model was the best fit for the examination of the independent variable. The analysis showed that the percentage of students qualifying for free or reduced-price lunch has a relatively flat slope that is slightly increasing in the range of the study. Figure 5 shows the scatterplot and fit line for the trend in students qualifying for free or reduced-price lunch from 2010-2018. When viewing the scatterplot in Figure 5 and the line graph in Figure 3, the slope of low SES students is more consistent without the dramatic increases or decreases displayed by the independent and dependent variables.

Figure 5. Scatterplot and fit line for the trend in students qualifying for free or reduced-price lunch from 2010-2018



Local Fiscal Effort Above RLE and Percentage of Students Attending a Fully Accredited School Slopes

An analysis of each of the 33 localities' data was conducted to determine which localities had high, low, or flat slopes for fiscal effort above RLE. This was determined by the slope of the rate of change of fiscal effort above RLE from 2011-2018. Upon examining the slope data, slope groups were determined by natural breaks in the slope totals. The flat slope group consisted of divisions with a slope between -2.9 and 0.9. The high slope group had slopes greater than or equal to 1.0 and the low slope group had slopes less than -3.0. Of the 33 localities, 11 localities had a high slope, 15 localities had a low slope, and eight localities had a flat slope. The slope of the mean for the sample was -1.4, in the flat slope range.

Next, an analysis of each of the 33 localities data was conducted to determine which localities had high, low, or flat slopes for percentage of students attending fully accredited schools. This was determined by the slope of the rate of change for the percentage of students attending fully accredited schools from 2011-2018. Upon examining the slope data, slope groups were determined by natural breaks in the slope totals. The flat slope group consisted of divisions with a slope between -3.0 and -0.5. The high slope group had slopes greater than or equal to -0.6 and the low slope group had slopes less than -3.1. Of the 33 localities, 11 localities had a high slope, 15 localities had a low slope, and eight localities had a flat slope (See Appendix B) (Cedo, 2014, p. 74-77). West Point and Wise County both had slopes of 0 because 100 percent of students in both of these divisions attended fully accredited schools from 2011-2018.

Further examination showed that 5 localities had high slopes in both fiscal effort above RLE and percentage of students attending fully accredited schools. Nine localities had low slopes in both fiscal effort above RLE and percentage of students attending fully accredited schools. three localities had high slopes in fiscal effort above RLE and low slopes in percentage of students attending fully accredited schools. Four localities had low slopes in fiscal effort above RLE and high slopes in percentage of students attending fully accredited schools.

The slopes of the percentage of students qualifying for free or reduced-price lunch in 23 of the 33 localities stayed flat or slightly increasing, mirroring the total data set. Upon examining the slope data, slope groups were determined by natural breaks in the slope totals. The flat slope group consisted of divisions with a slope between -0.5 and 1.9. The high slope group had slopes greater than 2.0 and no divisions had a slope less than -0.5. The slope of the means for the sample divisions from 2011-2018 was 1.4. Petersburg rose from 82.69 percent in 2014 to 100 percent in 2015 of students qualifying for free or reduced-price lunch. while

Petersburg maintained 100 percent of students qualifying in 2016, 2017, and 2018. The only other localities to have 100 percent of students qualifying for free or reduced-price lunch were Martinsville and Danville in 2018. Both of these localities had a more gradual increased slope to get to 100 percent.

Patterns in Local Fiscal Effort Above RLE and Accreditation

To address the research questions of what is the association of eight years of high, flat, and low slopes for fiscal effort with accreditation rates, the slopes of the fiscal effort for each locality was examined and categorized. Localities with a slope greater than or equal to 1.0 for fiscal effort above RLE were categorized as high slopes. Localities with a slope of -2.9 to 0.9 for fiscal effort above RLE were categorized as flat slopes. Localities with a slope of less than or equal to -3.0 for fiscal effort above RLE were categorized as low slopes. There were 11 localities with high slopes for fiscal effort above RLE (n = 11), eight localities with flat slopes for fiscal effort above RLE, and 15 localities with low slopes for fiscal effort above RLE.

After the localities were categorized into the three slope groups for fiscal effort above RLE, a *t*-test was run to compare average percentages of students attending fully accredited schools. First the *t*-test was run between high and flat slope localities, then between flat and low slope localities, and last for high and low slope localities. The average percentage of students attending fully accredited schools for localities with a high slope for fiscal effort above RLE was 78.30 percent. The average percentage of students attending fully accredited schools for localities with flat slope for fiscal effort above RLE was 80.93 percent. The average percentage of students attending fully accredited schools for localities with a low slope for fiscal effort above RLE was 65.59 percent (see Table 5). Results from the *t*-test between high and flat slope localities indicated no significant difference between the localities in average percentage of

students attending fully accredited schools, $t(19) = -.59$, $p = .75$. Results from the *t*-test between flat and low slope localities indicated significant difference between the localities in average percentage of students attending fully accredited schools, $t(23) = 3.09$, $p = .00$. Results from the *t*-test between high and low slope localities indicated significant difference between the localities in average percentage of students attending fully accredited schools, $t(26) = 2.85$, $p = .00$. Descriptive statistics for each of the slope groups were calculated in SPSS to determine the mean, standard deviation, minimum, and maximum for percentage of students attending fully accredited schools (see Table 5) (Cedo, 2014, p. 76).

Table 5. *Percentage of Students Attending Fully Accredited Schools According to Local Fiscal Effort Above RLE*

Percent of students in fully accredited schools average					
Slope group	Mean	N	Standard Deviation	Minimum	Maximum
High	78.30	11	27.366	0	100
Flat	80.93	8	26.487	0	100
Low	65.59	15	34.599	0	100
Total	73.31	34	31.263	0	100

Further analysis of the data was done within the slope categories. The slope categories of high and flat were combined for this analysis because the *t*-test showed no significance between these two categories. The means for fiscal effort above RLE were examined for each locality in each slope category. Each category was further categorized into low effort and high effort. The low effort localities had a mean effort above RLE less than or equal to 68.57. This number was chosen as it is the mean effort above RLE for all divisions in the sample in the range of the

study. The high effort localities had a mean effort above RLE greater than 68.57. Next, each locality was identified as high or flat slope and high effort, high or flat slope and low effort, low slope and high effort, or low slope and low effort. This was done to determine that despite a locality's slope of effort above RLE, if there was a viable effort above RLE that would result in acceptable academic output in the form of percentage of students attending a fully accredited school. Localities in each group are identified in Appendix C (Cedo, 2014, p. 78).

Table 6. *Cross tabulation of Effort Above RLE Category and Effort Above RLE Slope Group*

		Eight-year average effort above RLE category		
		Low Effort	High Effort	Total
Slope group				
	High or flat	13	6	19
	Low	7	8	15
Total		20	14	34

Table 7 shows the mean percentage of students attending a fully accredited school for each of the high and low effort groups within each slope category. The data in Table 7 indicate that localities with high or flat slope and low effort have the highest average percentage of students attending fully accredited schools (M = 80.32). Localities with high or flat slope and high effort have the next highest percentage of students attending fully accredited schools (M = 77.43). There is a similar gap of 3.39 percent between the low effort (M = 67.40) and high effort groups (M = 64.01) in the low slope category. The wider gap between the total means of the two slope groups of 13.82 percent (M = 79.41 for high or flat slopes, M = 65.59 for low slopes)

indicates a correlation between a high or flat slope in effort above RLE and the percentage of students attending a fully accredited school.

Table 7. *Mean Percentage of Students Attending Fully Accredited Schools by Local Effort Above RLE*

Percent of students in fully accredited schools average					
Percent above RLE category for divisions with high or flat slopes	Mean	N	Standard Deviation	Minimum	Maximum
Low effort	80.32	13	25.849	0	100
High effort	77.43	6	29.359	0	100
Total	79.41	19	26.942	0	100
Percent above RLE category for divisions with low slopes					
Low effort	67.40	7	37.262	0	100
High effort	64.01	8	32.305	0	100
Total	65.59	15	34.599	0	100

Multiple Regression Analysis

A multiple regression analysis was conducted to determine if sustained increases or decreases in local effort above RLE have a relationship with increasing or decreasing percentage of students in fully accredited schools. Using SPSS software, multiple regression analysis was done with time and effort above RLE serving as the predictor variables and percentage of students in fully accredited schools as the criterion variable. Examination of the data in Table 8 shows that the probability of the *F* statistic (.138) for the overall regression relationship was >0.001 using a level of significance of 0.05. Therefore, the null hypothesis of no relationship

between the set of predictor variables and the criterion variable fails to be rejected. There was not a statistically significant relationship between the set of predictor variables and the criterion variable. The predictor was weak because of the high number for the residual. The fluctuation in percentage of students in fully accredited schools cannot be accredited to time and effort above RLE. The strength of the relationship is shown in Table 8 in the *R* value. The *R* for the relationship between the variables is .023 demonstrating a moderate correlation (Cedo, 2014, p. 79-80). This data indicates a limitation of this study, in that the non-linear, or curvilinear, visual data may not be best analyzed with a linear regression. The large fluctuations in each variable, year to year over only an eight-year range makes linear analysis less reliable.

Table 8. *Multiple Regression Analysis Results*

ANOVA[a]

Model	Sum of Squares	*df*	Mean square	*F*	Sig.	*R*	*R square*	Adjusted *R square*	Standard error of Measurement
Regression	135.663	1	135.663	.138	.710[b]	.023[a]	.001	-.003	31.313
Residual	264732.636	270	980.491						
Total	264868.299	271							

a. Dependent Variable: Percent in accredited schools
b. Predictors: (Constant), Year, Percent above RLE

One-way ANCOVA Controlling for Low SES

A one-way between groups analysis of covariance (ANCOVA) was conducted to compare effort above RLE to percentage of students in a fully accredited schools while controlling for student poverty. The independent variable was the effort above RLE and the dependent variable was the percentage of students in a fully accredited school. The percentage

of students qualifying for free or reduced-price lunch (low SES students) was used as the covariate in this analysis.

Preliminary checks were conducted to ensure that there was no violation of the assumptions of normality, linearity, homogeneity of variances, homogeneity of regression slopes and reliable measurement of the covariate. After controlling for low SES, there was no significant relationship between the effort above RLE and percentage of students in a fully accredited schools, F (1, 5) = .85, p = .67, partial eta squared = .97. The partial eta squared score of .97 does show a strong relationship between the percent of low SES students and effort above RLE. This finding aligns with the sample group being the lowest quartile of localities in fiscal capacity (LCI < .30). There was a moderate relationship between the percentage of low SES students and the percentage of students in fully accredited schools, as indicated by a partial eta squared value of .30 (Pallant, 2013, p. 316).

Table 9. *Relationship Between Independent Variables and Dependent Variable*

ANCOVA[a]

	Type III sum of Squares	*df*	Mean square	*F*	Sig.	Partial Eta squared
Corrected model	260603.947[a]	266	979.714	1.149	.499	.984
Intercept	10254.920	1	10254.920	12.024	.018	.706
Percent low SES	1826.367	1	1826.367	2.141	.203	.300
Percent above RLE	194082.752	265	732.388	.859	.673	.979
Error	4264.352	5	852.870			
Total	1726779.665	272				
Corrected total	264868.299	271				

a. Dependent Variable: Percent in accredited schools

b. R Squared = .984 (Adjusted R. Squared = .127)

CHAPTER 5

DISCUSSION

Overview

The purpose of this study is to explore the relationship between effort above required local effort (RLE) and school accreditation status in Virginia's poorest localities using the following research questions:

RQ1: Controlling for SES, what is the association of eight years of high slope for fiscal effort above RLE on accreditation rates?

RQ2: Controlling for SES, what is the association of eight years of flat slope for fiscal effort above RLE on accreditation rates?

RQ3: Controlling for SES, what is the association of eight years of low slope for fiscal effort above RLE on accreditation rates?

Chapter 1 includes the conceptual framework for the study, the purpose and significance of the study, the research questions, the methodology, delimitations, and definitions of key terms used. Chapter 2 presents a literature review of equity and adequacy in school funding. It includes the roles of the levels of government in school finance, fiscal capacity and effort, Virginia's systems to meet constitutional compliance of providing a quality public education, educational accountability, educational production function, change rate of fiscal effort, and a revisit of adequacy as a conceptual framework. Chapter 3 entails the study's methodology, including revisiting the research purpose and questions, the sample and range, variables, data collection and analysis, and limitations of the methods. Chapter 4 has the study's results, including descriptive findings, assumptions, and analysis of the collected data. Chapter 5

includes a discussion of the study and results, limitations of the study, and implications for further research and future policy.

Overall Discussion

With the onset of NCLB, states were given a framework to determine what adequacy was in the form of achievement and funding systems. While some states waited to be instructed to create more robust systems of accountability, Virginia embraced it in its constitution. The Virginia Constitution established the SOQ which created the foundation for educational quality in accountability and funding. The SOQ spell out the minimum resources required for each school division. The Local Composite Index, which is named in the Standards of Quality, determines a locality's fiscal capacity and minimum effort. Therefore, the SOQ outline Virginia's definition of adequate or minimum local fiscal effort. Additionally, the SOQ name the Standards of Accreditation, a combined measure of indicators, to determine an acceptable level of academic performance in student achievement at the school level. Starting in 2010, the Virginia legislature required a report of what percentage above the required local fiscal effort each school division received. However, there has not been a prior study to determine if the minimum fiscal effort required by Virginia is associated with schools meeting the minimum student achievement standards for full accreditation. The literature review indicates that after controlling for low SES, there may be a positive association between a high slope for fiscal effort over eight years and the percent of students in a division who attend a fully accredited school. In short, the literature indicates that Virginia's definition of adequate funding may not be sufficient for producing schools that meet standards for full accreditation.

This study adds to previous research regarding fiscal effort and academic outcomes (Cedo, 2014; Ellison, 2015; Goodale, 2009; Johnson, 2014). This study fills a gap in the

literature by focusing on Virginia's funding and academic accountability policies through the lens of adequacy. The earlier studies focused on dependent variables that are singular outcomes such as juvenile incarceration rates and graduation rates, while this study looked at the comprehensive measure of Virginia school accreditation: measured by the percentage of enrolled students attending a fully accredited school. Accreditation is how Virginia defines a school as demonstrating sufficient academic performance to meet state accreditation standards. Earlier studies also used other definitions of fiscal effort at the state and local levels. This study used the Virginia definition of Required Local Effort for the Standards of Quality as the base line for local fiscal effort. Fiscal effort above RLE was measured through the actual local expenditures for operations above required local effort for SOQ, as reported to the Virginia General Assembly and required by Virginia law. This study adds to the body of knowledge to determine if Virginia's funding laws for fiscal adequacy are adequate in providing for what Virginia law deems sufficient in school achievement, school accreditation.

The study identifies the poorest quartile of localities in Virginia by identifying the 33 localities that had a Local Composite Index of less than .30 for the range of the study. The Local Composite Index is Virginia's measure of local fiscal capacity. For each of the 33 localities, the following variables were collected for the range of the study, 2010-2018:

- The independent variable of percent of actual local expenditures for operations above required local effort for SOQ;
- The dependent variable of the percent of students attending a fully accredited school; and
- The co-variate (or control variable) of the percent of enrolled students who qualified for free or reduced-price lunch.

The data were analyzed and slopes were determined to establish effort above RLE over time and accreditation rates over time. The localities were categorized based on the slope of their effort above RLE from 2010-2018 and whether their average effort above RLE was above or below the mean of the group. T-tests were performed to determine if there were significant differences between effort above RLE groups and accreditation rates. Additionally, a multiple regression analysis was run to determine the association between effort above RLE and accreditation results. Finally, a one-way between groups analysis of covariance (ANCOVA) was conducted to compare effort above RLE to accreditation while controlling for student poverty.

Discussion of Results

Figure 3. Line graph for the trend in percent above RLE, percent of students in fully accredited schools, and percent of low SES students for the sample localities from 2010-2018

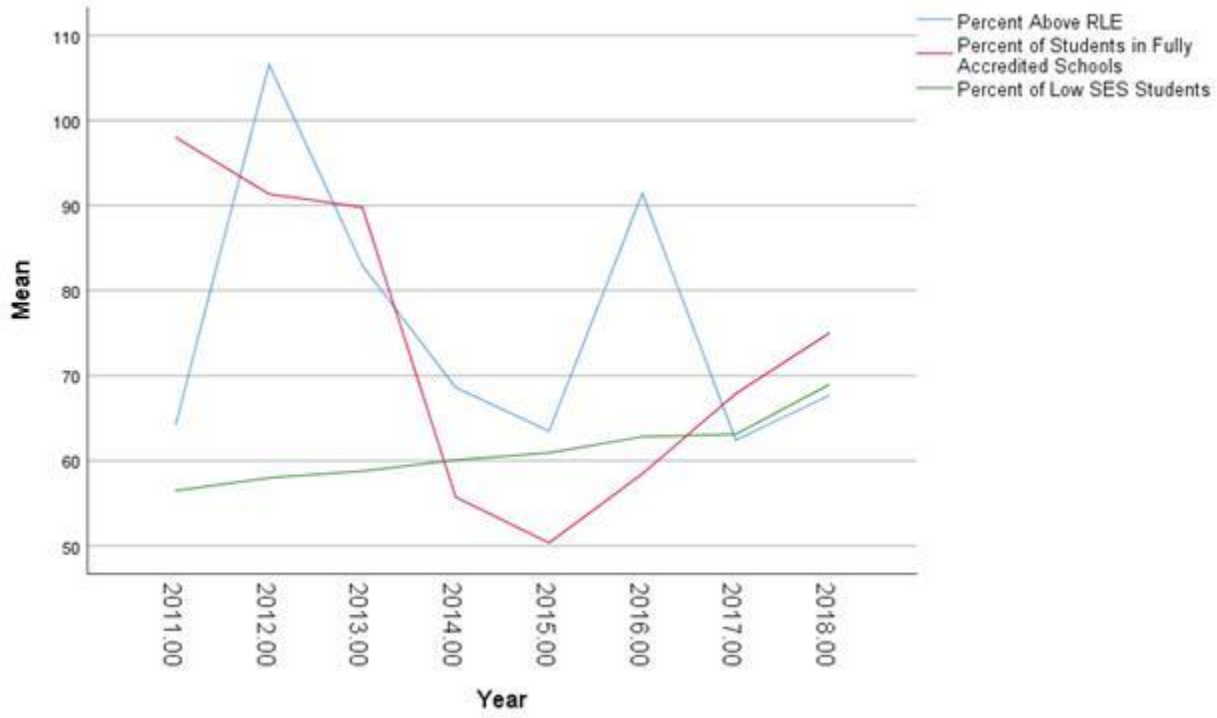


Figure 3 is the best visual summary of this study's results. There is a visual correlation of the non-linear data. The percent of students attending fully accredited schools trended sharply down

from 2011 through 2015. This correlates with the decrease in effort above RLE from 2012 through 2015. There is an increase in effort above RLE and accreditation rates in 2016. The multiple regression analysis of the data did not support these visual conclusions. Examination of the data in Table 8 (p. 64) shows there was not a statistically significant relationship between the effort above RLE and each passing year and the percent of students in accredited schools. The fluctuation in percentage of students in fully accredited schools cannot be attributed to time and effort above RLE. The strength of the relationship between the variables is .023 demonstrating a moderate correlation (Cedo, 2014, p. 79-80). The ANCOVA revealed, controlling for student poverty, produced similar results. After controlling for low SES, there was no significant relationship between the effort above RLE and percentage of students in fully accredited schools. The partial eta squared score of .97 did show a strong relationship between the percent of low SES students and effort above RLE. This finding points to a relationship between student poverty and local fiscal capacity and effort. There was also a moderate relationship between the percentage of low SES students and the percentage of students in fully accredited schools (Pallant, 2013, p. 316). The failure of the multiple regression analysis and the ANCOVA to robustly support the visual correlation of the line graph indicates a limitation of this study, in that the non-linear, or curvilinear, visual data may not be best analyzed with a linear regression. The large fluctuations in each variable, year to year over an eight-year range makes linear analysis less reliable.

The analysis of patterns in the data, variable slopes, and t-tests confirmed the results of the visual data. Localities were categorized into groups based on the slope of their effort above RLE. The t-tests performed showed no significant difference in accreditation results between localities with a flat or high slope rate in fiscal effort. However, t-tests did show there was a

significant difference between the accreditation results between the localities with a low slope rate in effort above RLE and those with a flat or high slope in effort above RLE. In Table 7 (p. 63) the data show a difference of 13.82 percentile points when comparing the mean percentage of students who attend a fully accredited school in a locality with a flat or high effort above RLE slope (79.41%) versus a locality with a low effort above RLE slope (65.59%). There was not a significant difference if a locality had a mean effort above RLE above or below the average of the sample 33 localities. Sustained and increased effort above RLE had a positive association to a higher percentage of students attending a fully accredited school.

The results of the tests and analyses in this study lend themselves to a practical significance rather than a statistical significance. "Statistical significance is concerned with whether a research result is due to chance or sampling variability; practical significance is concerned with whether the result is useful in the real world" (Kirk, 1996, p. 746). The results of the multiple regression analysis and the ANCOVA showed no statistically significant relationship between the independent and dependent variables. However, since the analysis of patterns in the data, variable slopes, and t-tests confirmed the results of the visual data, there does seem to be a practical significance that can be applied in the real world.

Sustained Fiscal Effort Above RLE

As mentioned in Chapter 2, sustained effort is important in order to see sustained desired effects of any reform; "it is important to remind ourselves that the goal is not only to establish large-scale reform, but to sustain it" (Fullan, 2000, p. 20). Reform efforts often fail to sustain fiscal effort. Programs that lack sustainability have the common factor of funding falling short after 3-5 years (Berman & McLaughlin, 1978, Fullan, 2000). Sustaining change and fiscal effort is important because in schools it can take two to six years to see the impact of reform and

up to eight years on the district level (Fullan, 2000, p. 20). The findings in this study support the findings of the literature review. The localities with flat or high slopes for effort above RLE, showing sustained or increasing effort, had a higher accreditation rate. The standard deviation for accreditation rates for localities in the low slope group for effort above RLE is higher than the standard deviation for accreditation rates in the high and flat slope groups (see Table 7, p. 63). This shows more consistent academic results in localities with sustained or increased effort above RLE.

There are limitations to this study that could affect these results. The range of this study immediately follows the start of the Great Recession when "median wealth plummeted by 44 percent over years 2007 to 2010" as well as a drop in housing prices (Wolff, 2014, p. 4). The effects of the Great Recession on individual wealth and consequently fiscal capacity are not yet fully known. Lean fiscal years from the Great Recession could also limit the political will of localities to sustain or increase fiscal effort. Additionally, the sample localities in this study are similar in fiscal capacity and individual poverty, yet there can be many differences in community make-up and size.

Virginia Accreditation

School accreditation in Virginia is a cumulative measure of overall school quality, including state standardized test scores, student attendance, and graduation rates. School accreditation in Virginia is also a moving target. When searching the Virginia Department of Education online archives of news releases, there have been 24 news releases regarding changes to the accreditation process since 2010 (Virginia Department of Education, 2019a). Changes to accreditation methods and the encompassed tests are to be expected. The Virginia law regarding the review of the SOLs reads:

> "The Standards of Learning in all subject areas shall be subject to regular review and revision to maintain rigor and to reflect a balance between content knowledge and the application of knowledge in preparation for eventual employment and lifelong learning. The Board of Education shall establish a regular schedule, in a manner it deems appropriate, for the review, and revision as may be necessary, of the Standards of Learning in all subject areas. Such review of each subject area shall occur at least once every seven years. Nothing in this section shall be construed to prohibit the Board from conducting such review and revision on a more frequent basis" (Commonwealth of Virginia, 2019).

The mandated reviews of the standards align with the purpose of the SOL tests and the Virginia Standards of Accreditation (SOA) which "are designed to ensure that an effective educational program is established and maintained in Virginia's public schools" (Virginia State Board of Education, 2015, p. 3). The SOA are the operational and measurement side of ensuring an effective educational program. Revisions to what constitute accreditation continue to be made by the Virginia Department of Education. Changes to the accreditation standards are not required. The policy only dictates that the SOL and SOA be reviewed at least every seven years.

The review of tests used for accreditation purposes have led to changes in the standards and the tests and have led to lower accreditation rates. Some of the changes that coincided with the drop in accreditation rates in the range of this study were the 2011-2012 mathematics Standards of Learning testing. The drop in achievement was large enough across the state, the VDOE put out a press release on February 22, 2012 (Pyle and Grimes, 2012). The first administration of the new math tests in the fall of 2011 yielded pass rates of 49.2% in Algebra I, 63.0% in Geometry, and 53.7% in Algebra II (Pyle and Grimes, 2012, p. 1). At that time a

school had to have pass rate of 70% in mathematics for the most recent year or on average for the previous three years to received full accreditation status. The VDOE foresaw a drop in accreditation rates after these score results. In the same press release they had a subtitle, "Will the new Mathematics SOL tests impact school and division accountability ratings?" The short answer was yes. The news release stated:

> "Previous actions by the Board of Education to increase the rigor of the Standards of Learning program through the years have had a short-term impact on pass rates and the accountability ratings of schools and divisions.
>
> For example, the shift in 2006 from cumulative assessments in reading and mathematics in grades 3, 5 and 8 to annual testing in grades 3-8 increased the rigor of the SOL program, especially in middle school mathematics, by testing deeper into the content at each grade level. Pass rates and accreditation ratings subsequently recovered as school divisions – with technical support from the Virginia Department of Education (VDOE) – increased the quality and depth of instruction.
>
> The introduction in 2010-2011 of SOL history tests with more rigorous items types also resulted in lower pass rates in many schools. History pass rates are expected to rebound as teachers prepare students to apply their content knowledge in ways not previously assessed.
>
> As it has in the past, three-year averaging – as allowed under Virginia's accountability program – will mitigate the impact of the new mathematics tests on federal adequate yearly progress (AYP) ratings under No Child Left Behind (NCLB) and state accreditation ratings for the 2012-2013 school year" (Pyle and Grimes, 2012, p. 2-3).

Accreditation rates dropped as expected in 2012 and 2013; however, the three-year averaging only mitigated the impact of the new math tests for two years. In 2014, accreditation rates plummeted by over 30 percent and fell again in 2015. It is important to cite these changes in accreditation measures when considering overall accreditation rates. The drop in accreditation rates also coincide with a drop in fiscal effort above RLE. Accreditation rates and fiscal effort above RLE both started to increase in 2016.

Limitations

This study does have limitations that must be identified in order to completely appreciate the findings. There are multiple factors that affect academic performance that were not considered in this study. This study only took into account effort above RLE, Local Composite Index, and percentage of students who qualified for free or reduced-price lunch. Factors such as ethnicity demographics, school size, school division size, teacher to student ratios, pre-school participation, students with disabilities, and school grade levels were not taken into account. The sampling of the data is also a limitation. Only 33 localities were examined rather than all localities in Virginia.

Since this is an ex post facto study it should not be overly generalized to future events. Also, although this study uses all data points for local effort above RLE for the 33 localities (since the inception of its reporting), the sample and range are not all-inclusive and therefore cannot validate all generalizations of these variables. Moreover, this study examines the school divisions' spending above RLE and does not consider how those funds may be allocated among the various schools in the system such as central office support staff or prioritizing the needs of one school over another. The VDOE has changed graduation and accreditation requirements multiple times in the range of the study ("VDOE: Graduation (Diploma) Seals of Achievement,"

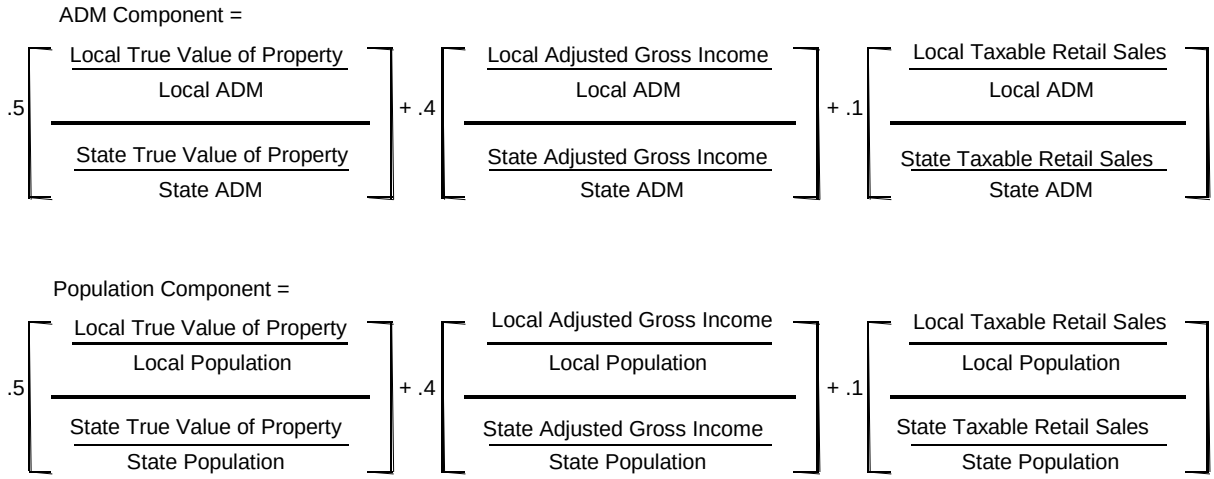
2016c). Consequently, going forward, the study may become less applicable, even within student outcome measures in Virginia, as the definition of accreditation continues to change. Finally, non-linear, or curvilinear, visual data may not be best analyzed with linear regressions.

Implications for Future Research

The limitations of this study point to implications for future research. This study only considered the 33 localities that maintained a Local Composite Index of less than .3 during the range of the study. While this was a control for poverty, or fiscal capacity, it limited the study to one quarter of the school divisions in Virginia. Considering all of the localities and school divisions in Virginia would give a more complete picture. It would also provide the ability to compare different bands of localities categorized by LCI.

The LCI does not divide divisions by division size. Localities receive state funding for SOQ funded positions based on student enrollment, or Average Daily Membership (ADM). The largest school division in Virginia, Fairfax County, has 187,830 students enrolled in the 2018-2019 school year. The smallest school division in Virginia, Highland County, has 205 enrolled students (Virginia Department of Education, 2019b). When considering the funding formula for the state (see Figure 1), ADM is a multiplier for funding. The concept of economies of scale suggests that there are more potential cost savings for larger operations. The smallest division in this study is West Point, with 805 students. The largest division in this study is Newport News, with 28,654 students (Virginia Department of Education, 2019b). The body of knowledge would benefit from the addition of a study focusing on the benefits and disadvantages of school division size and funding.

Figure 1 – The Calculation of the Composite Index



Local Composite Index =

((.6667 x ADM Component) + (.3333 x Population Component)) x 0.45 (average local share)

Figure 1. Virginia's Calculation of the Local Composite Index

Source: Virginia Department of Education, 2017f.

Another area for future study would be how divisions with a higher accreditation rating are distributing their funds. This information could be used to amend the Standards of Quality. Finally, an area for future study would be to explore the association between a locality's Local Composite Index and the accreditation ratings.

Conclusions and Policy Implications

The research in this study shows that when using a linear regression analysis or an ANCOVA there is no relationship between effort above RLE and the percentage of students attending an accredited school. However, non-linear, or curvilinear, visual data may not be best analyzed with linear regressions. When looking at the non-linear data in this study, there did appear to be a relationship between effort above RLE and the percentage of students attending an

accredited school. The t-tests run showed no significant difference between flat and increased slopes in effort above RLE on the percentage of students attending accredited schools. T-tests did show a significant difference between the flat or increased slopes and decreased slopes. Further, localities with flat or increased slopes in effort above RLE had the largest average percentage of students attending accredited schools. The conclusion being that sustained and increasing effort above RLE has a positive relationship to a higher percentage of students attending accredited schools. Specifically, this study shows that localities with sustained or increasing effort above RLE have a difference of 13.82 percentage points of students attending accredited schools when compared to localities with decreasing effort above RLE. When considering the largest division in this study, Newport News, that would potentially impact 3,960 more students. In the largest division in the state, Fairfax County, potentially 25,958 more students could be attending accredited schools. For all of Virginia, there is a potential that 178,349 more students could be attending accredited schools if all localities sustained or increased their effort above RLE. The policy implication of this study is a need for Virginia to revise Required Local Effort according to the Standards of Quality. In that process, Local Composite Index and the Standards of Quality may need revisions on how funding is allocated. The data from this study show that Virginia's policies for minimal adequate effort do not correlate to schools being consistently successful in meeting the minimum academic output expectation of accreditation in the divisions with the lowest fiscal capacities. Localities that have sustained and increased effort above Required Local Effort have experienced greater success in providing accredited schools for students.

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Appendix A

Descriptive Statistics[a]					
	N	Minimum	Maximum	Mean	Std. Deviation
Percent of low SES students	8	45	53	47.96	3.259
Percent in accredited schools	8	8	100	68.53	32.922
Percent above RLE	8	30	180	142.62	49.608
Valid N (listwise)	8				
a. Alleghany					
Descriptive Statistics[a]					
	N	Minimum	Maximum	Mean	Std. Deviation
Percent of low SES students	8	75	97	86.2	9.007
Percent in accredited schools	8	14	100	47.64	30.706
Percent above RLE	8	14	54	32.43	14.725
Valid N (listwise)	8				
a. Brunswick					
Descriptive Statistics[a]					
	N	Minimum	Maximum	Mean	Std. Deviation
Percent of low SES students	8	39	57	49.12	5.805
Percent in accredited schools	8	0	100	44.07	42.131
Percent above RLE	8	24	86	54.33	23.062
Valid N (listwise)	8				
a. Buena Vista					
Descriptive Statistics[a]					
	N	Minimum	Maximum	Mean	Std. Deviation
Percent of low SES students	8	39	47	43.26	2.3
Percent in accredited schools	8	69	100	86.56	10.509
Percent above RLE	8	68	115	101.39	15.992
Valid N (listwise)	8				
a. Campbell					
Descriptive Statistics[a]					
	N	Minimum	Maximum	Mean	Std. Deviation
Percent of low SES students	8	56	59	57.64	1.324
Percent in accredited schools	8	78	100	92.28	7.115
Percent above RLE	8	56	107	89.17	18.318
Valid N (listwise)	8				
a. Carroll					
Descriptive Statistics[a]					

	N	Minimum	Maximum	Mean	Std. Deviation
Percent of low SES students	8	53	59	56.39	1.843
Percent in accredited schools	8	75	100	90.27	9.969
Percent above RLE	8	6	49	27.25	16.295
Valid N (listwise)	8				

a. Charlotte

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation
Percent of low SES students	8	53	60	56.62	2.684
Percent in accredited schools	8	38	100	72.35	25.946
Percent above RLE	8	103	260	162.65	62.698
Valid N (listwise)	8				

a. Covington

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation
Percent of low SES students	8	59	74	66	4.213
Percent in accredited schools	8	0	100	53.79	44.094
Percent above RLE	8	24	78	57.25	17.379
Valid N (listwise)	8				

a. Cumberland

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation
Percent of low SES students	8	73	100	83.58	10.906
Percent in accredited schools	8	10	100	52.74	41.135
Percent above RLE	8	55	117	78.9	20.341
Valid N (listwise)	8				

a. Danville

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation
Percent of low SES students	8	52	70	57.99	5.924
Percent in accredited schools	8	19	100	80.58	29.394
Percent above RLE	8	29	143	84.28	38.132
Valid N (listwise)	8				

a. Dickenson

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation
Percent of low SES students	8	50	55	51.92	1.456
Percent in accredited schools	8	37	100	73.73	21.278
Percent above RLE	8	37	80	65.78	14.98
Valid N (listwise)	8				
a. Dinwiddie					
Descriptive Statistics[a]					
	N	Minimum	Maximum	Mean	Std. Deviation
Percent of low SES students	8	67	92	74.11	7.955
Percent in accredited schools	8	26	100	55.13	37.174
Percent above RLE	8	29	75	49.83	14.585
Valid N (listwise)	8				
a. Emporia					
Descriptive Statistics[a]					
	N	Minimum	Maximum	Mean	Std. Deviation
Percent of low SES students	8	59	67	63.68	2.666

Percent in accredited schools	8	38	100	92.28	21.828
Percent above RLE	8	37	84	58.29	17.806
Valid N (listwise)	8				
a. Galax					
Descriptive Statistics[a]					
	N	Minimum	Maximum	Mean	Std. Deviation
Percent of low SES students	8	42	47	44.96	1.712
Percent in accredited schools	8	72	100	89.5	14.495
Percent above RLE	8	26	68	42.16	13.654
Valid N (listwise)	8				
a. Giles					
Descriptive Statistics[a]					
	N	Minimum	Maximum	Mean	Std. Deviation
Percent of low SES students	8	67	92	74.11	7.955
Percent in accredited schools	8	26	100	55.13	37.174
Percent above RLE	8	16	68	39.98	17.611
Valid N (listwise)	8				
a. Greensville					
Descriptive Statistics[a]					
	N	Minimum	Maximum	Mean	Std. Deviation

Percent of low SES students	8	50	62	56.93	3.304
Percent in accredited schools	8	41	96	67.58	19.499
Percent above RLE	8	82	143	110.13	19.644
Valid N (listwise)	8				

a. Hampton

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation
Percent of low SES students	8	60	85	68.7	7.638
Percent in accredited schools	8	59	100	86.77	14.458
Percent above RLE	8	16	60	34.65	14.449
Valid N (listwise)	8				

a. Henry

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation
Percent of low SES students	8	72	93	79.96	7.452
Percent in accredited schools	8	28	100	50.9	27.338
Percent above RLE	8	73	131	101.46	21.791
Valid N (listwise)	8				

a. Hopewell

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation
Percent of low SES students	8	61	92	69.03	9.84
Percent in accredited schools	8	38	100	76.36	21.945
Percent above RLE	8	0	17	8.75	5.983
Valid N (listwise)	8				

a. Lee

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation
Percent of low SES students	8	64	69	66.95	1.56
Percent in accredited schools	8	0	100	47.47	40.223
Percent above RLE	8	10	50	29.65	13.919
Valid N (listwise)	8				

a. Lunenburg

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation
Percent of low SES students	8	69	100	80.6	10.003

Percent in accredited schools	8	0	100	52.81	47.389
Percent above RLE	8	11	148	104.17	41.637
Valid N (listwise)	8				

a. Martinsville

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation
Percent of low SES students	8	54	67	60.97	4.357
Percent in accredited schools	8	29	100	63.55	23.553
Percent above RLE	8	101	152	116.88	20.524
Valid N (listwise)	8				

a. Newport News

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation
Percent of low SES students	8	60	68	64.29	2.982
Percent in accredited schools	8	0	100	61.31	39.99
Percent above RLE	8	11	27	15.15	5.93
Valid N (listwise)	8				

a. Nottoway

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation
Percent of low SES students	8	52	56	54.68	1.556
Percent in accredited schools	8	59	100	92.96	14.665
Percent above RLE	8	7	30	17.01	8.674
Valid N (listwise)	8				

a. Patrick

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation
Percent of low SES students	8	75	100	89.13	11.864
Percent in accredited schools	8	0	62	24.37	21.341
Percent above RLE	8	36	134	73.86	35.675
Valid N (listwise)	8				

a. Petersburg

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation
Percent of low SES students	8	51	58	54.37	2.16
Percent in accredited schools	8	74	100	93.54	9.202

Percent above RLE	8	13	27	20.22	6.183
Valid N (listwise)	8				

a. Pittsylvania

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation
Percent of low SES students	8	60	77	66.72	5.285
Percent in accredited schools	8	37	96	64.43	19.783
Percent above RLE	8	47	296	131.66	76.52
Valid N (listwise)	8				

a. Portsmouth

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation
Percent of low SES students	8	37	43	39.82	1.807
Percent in accredited schools	8	62	100	90.71	14.238
Percent above RLE	8	11	61	45.28	16.246
Valid N (listwise)	8				

a. Prince George

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation
Percent of low SES students	8	52	62	55.7	3.097
Percent in accredited schools	8	57	100	88.79	18.046
Percent above RLE	8	9	175	38.95	55.338
Valid N (listwise)	8				

a. Russell

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation
Percent of low SES students	8	54	62	58.23	2.742
Percent in accredited schools	8	89	100	98.15	3.817
Percent above RLE	8	6	44	16.17	12.389
Valid N (listwise)	8				

a. Scott

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation
Percent of low SES students	8	56	67	57.98	3.768
Percent in accredited schools	8	63	100	88.29	15.52
Percent above RLE	8	9	51	35.2	14.709
Valid N (listwise)	8				

a. Smyth

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation
Percent of low SES students	8	49	63	53.22	4.563
Percent in accredited schools	8	63	100	90.08	13.254
Percent above RLE	8	9	45	22.44	11.292
Valid N (listwise)	8				

a. Tazewell

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation
Percent of low SES students	8	26	32	28.9	2.299
Percent in accredited schools	8	100	100	100	0
Percent above RLE	8	203	284	244.96	27.702
Valid N (listwise)	8				

a. West Point

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation
Percent of low SES students	8	54	72	58.83	5.805
Percent in accredited schools	8	100	100	100	0
Percent above RLE	8	20	154	78.7	47.125
Valid N (listwise)	8				

a. Wise

Appendix B

Division	Slope of Percent of students in accredited schools	Slope of percent above RLE	Slope of percent of low SES
Alleghany	-0.05015	8.113452	0.975357
Brunswick	-10.6943	0.517024	3.279762
Buena Vista	-7.5981	-4.94655	1.882738
Campbell	-1.89976	5.440952	0.767024
Carroll	-0.22571	3.737262	0.085595
Charlotte	-1.74762	-4.37262	-0.17131
Covington	1.742857	-12.9287	0.2925
Cumberland	-9.7969	-6.13845	1.15131
Danville	-15.9987	-4.7394	4.037381
Dickenson	-2.22119	-12.5808	2.138452
Dinwiddie	-1.70036	3.137738	0.150833
Emporia	-12.6419	3.408095	2.592262
Galax	0.735	-4.25702	0.417262
Giles	0.334643	5.129762	0.334643
Greensville	-12.6419	-4.44786	2.592262
Hampton	-4.22321	-3.9825	1.117024
Henry	-2.8381	-1.87024	2.77869
Hopewell	-8.91357	-3.97619	2.787738
Lee	-3.12381	-0.25964	3.198214
Lunenburg	-9.24595	-4.88321	-0.23893
Martinsville	-11.9315	2.49619	3.800357
Newport News	-6.87952	-4.68083	1.693333
Nottoway	-6.48298	0.809524	0.651667
Patrick	-1.04167	-0.18012	-0.45167
Petersburg	-6.54381	-8.4944	4.329286
Pittsylvania	-0.48274	0.073571	0.768452
Portsmouth	-4.72393	21.25643	1.682738
Prince George	-2.87869	-0.37262	0.682738
Russell	-0.45893	-12.046	1.072619
Scott	0.074405	-1.4794	0.988214
Smyth	-1.04595	1.432024	0.962476
Tazewell	1.278929	1.07369	1.667857
West Point	0	3.547262	0.71
Wise	0	-11.2892	1.847738
Mean	-4.49633	-1.40449	1.497563

Appendix C

Division	Slope Group	Effort Group	Mean percent above RLE 2010-2018	Mean percent of students attending accredited schools 2010-2018
Alleghany	High	High effort	142.624	68.5313
Brunswick	Flat	Low effort	32.4338	474.645
Buena Vista	Low	Low effort	54.3313	44.065
Campbell	High	High effort	101.385	86.5575
Carroll	High	High effort	89.1713	92.275
Charlotte	Low	Low effort	27.2525	90.27
Covington	Low	High effort	162.649	72.35
Cumberland	Low	Low effort	57.2463	53.785
Danville	Low	High effort	78.8963	52.7413
Dickenson	Low	High effort	84.2763	80.575
Dinwiddie	High	Low effort	65.7838	73.7288
Emporia	High	Low effort	49.8325	55.125
Galax	Low	Low effort	58.2888	92.2825
Giles	High	Low effort	42.1625	89.4988
Greensville	Low	Low effort	39.98	55.125
Hampton	Low	High effort	110.131	67.5813
Henry	Flat	Low effort	34.6475	86.77
Hopewell	Low	High effort	101.458	50.895
Lee	Flat	Low effort	8.74625	76.3625
Lunenburg	Low	Low effort	29.6463	47.47
Martinsville	High	High effort	104.173	52.8113
Newport News	Low	High effort	116.881	63.55
Nottoway	Flat	Low effort	15.15	61.3063
Patrick	Flat	Low effort	17.0088	92.96
Petersburg	Low	High effort	73.8588	24.37
Pittsylvania	Flat	Low effort	20.2175	93.5438
Portsmouth	High	High effort	131.663	64.4313
Prince George	Flat	Low effort	45.2775	90.7063
Russell	Low	Low effort	38.945	88.7888
Scott	Flat	Low effort	16.1738	98.1463
Smyth	High	Low effort	35.1963	88.2875
Tazewell	High	Low effort	22.4363	90.0788
West Point	High	High effort	244.961	100
Wise	Low	High effort	78.6988	100
Mean		Mean	68.5759	73.3122

Vita

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2003 – 2009	Social Studies Teacher James River High School 3700 James River Road Midlothian, VA 23113

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